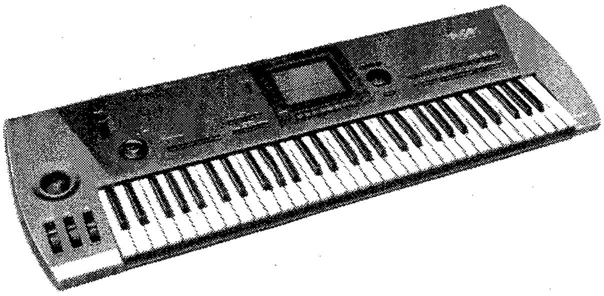
ORDER NO. EMID951601
A5

Service Manual

SYNTHESIZER
SX-WSA1

(M), (MC), (XM), (EN), (EH), (EF), (EZ), (EW), (EA), (EP), (EK), (XL), (XR), (XS), (XD), (XT), (X), (XP)



AREAS

(M):	U.S.A.
(MC):	Canada
(XM):	Mexico
(EN):	Norway, Sweden, Denmark, Finland
(EH):	Holland, Belgium
(EF):	France, Italy
(EZ):	Germany
(EW):	Switzerland
(EA):	Austria
(EP):	Spain, Portugal, Greece, Singapore, South Africa
(EK):	the United Kingdom
(XL):	New Zealand
(XR):	Australia
(XS):	Malaysia
(XD):	Saudi Arabia, Hong Kong, Kuwait
(XT):	Taiwan
(X):	Thailand, Indonesia, Iran, U.A.E., Panama, Argentina, Peru, Brasil
(XP):	Philippines

⚠ **WARNING**

This service information is designed for experienced repair technicians only and is not designed for use by the general public. It does not contain warnings or cautions to advise non-technical individuals of potential dangers in attempting to service a product. Products powered by electricity should be serviced or repaired only by experienced professional technicians. Any attempt to service or repair the product or products dealt with in this service information by anyone else could result in serious injury or death.

■ Specifications

KEYBOARD		61 KEYS (WITH INITIAL/AFTER TOUCH)
SOUND GENERATOR		ACOUSTIC MODELING SYNTHESIS
MAXIMUM NUMBER OF NOTES PRODUCED SIMULTANEOUSLY		64 NOTES (32 PARTS MAX.)
SOUND		PRESET (ROM): 256 SOUNDS +16 DRUM KITS, 128 COMBINATIONS USER: 256 SOUNDS + 4 DRUM KITS, 128 COMBINATIONS RE-MAP: 1, 2, 3 (GENERAL MIDI)
BANK		USER 1, 2, ROM/EXT
CONTROLLER		REALTIME CONTROLLER, REALTIME CREATOR, PITCH BEND WHEEL, MODULATION WHEEL 1, 2
EDIT	SOUND	MODELING, TONE LAYER, PITCH, FILTER, AMPLITUDE, DIGITAL EFFECT, DSP EFFECT, CONTROLLER
	COMBINATION	INTERNAL SOUND, MIDI SOUND, CONFIGURE, MIXER, DSP EFFECT
DIGITAL EFFECT		12 TYPES
DSP EFFECT		EFFECT 44 TYPES, REVERB 12 TYPES
SEQUENCER		16 TRACKS RESOLUTION : 96 PULSES PER QUARTER-NOTE STORAGE CAPACITY : APPROX. 47000 NOTES (10 SONGS MAX.) INPUT MODES : REALTIME RECORD, STEP RECORD, MASTER RECORD FUNCTIONS : TRACK ASSIGN, EDIT, SONG SELECT/NAME, MEDLEY, AFTER TOUCH SET
PART		INTERNAL SOUND, CONFIGURE, MIDI OUTPUT FILTER, MIXER, DSP EFFECT
SYSTEM		TUNE & SCALE, OVERALL TOUCH SENSITIVITY, CONTROLLER ASSIGN, MIXER, DSP EFFECT, INITIAL, RE-MAP EDIT, SOUND/COMBI MANAGER, DRUMS MAP, MAIN OUT EQUALIZER
MIDI		TOTAL MODE, REALTIME MESSAGE, INPUT & OUTPUT FILTER, PROGRAM CHANGE MIDI OUT, SYSEX BULK DUMP, GENERAL MIDI
DISK		BUILT-IN 3.5 inch FLOPPY DISK DRIVE FOR 2HD (1.44 MB), 2DD (720 KB) DISK LOAD, DISK SAVE, MIDI FILE DIRECT PLAY, DISK FORMAT, LOAD SINGLE SOUND, LOAD SINGLE COMBINATION
DISPLAY		LCD (320×240 DOTS) PAGE, CONTRAST, EXIT
OTHERS		VOLUME, DATA ENTRY DIAL/KEYS, COMPARE
TERMINALS		PHONES, MAIN OUT (R, L/MONO), SUB OUT (R, L/MONO), FOOT SW 1, 2, CONTROL PEDAL, MIDI (IN, OUT, THRU) ×2

Technics

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POWER REQUIREMENT	110 W, 100 W (CANADA), 80 W (U.S.A. AND MEXICO)
	AC120/220/240 V 50/60 Hz AC120 V 60 Hz (NORTH AMERICA AND MEXICO) AC230 V 50/60 Hz (NEW ZEALAND AND PHILIPPINES) AC230-240 V 50/60 Hz (EUROPE)
DIMENSIONS (W × H × D)	105.5 cm×11.5 cm×35.2 cm (41-17/32"×4-17/32"×13-27/32")
NET WEIGHT	13 kg (28.7 lbs.)
ACCESSORIES	AC CORD, DEMO DISK

•Specification are subject to change without notice for further improvement.

WARNING

To prevent the risk of fire, smoke, or electrical shock and to ensure safe operation, please be sure to follow the safety guidelines below.

1. At places where special caution is required, the necessary safety precautions are clearly labeled or printed, for example, on the cabinet, or on the part concerned. Please follow these safety precautions, and also those listed in the Owner's Manual.

2. Parts which have a ⚠ mark in the circuit diagram or in the parts list are essential for safety. When replacing these parts, be sure to use only the specified parts.

3. Use the specified types for internal wiring (double-insulated wiring, etc.).

4. When replacing parts on the AC primary side (power transformer, electric switch, electrical cord, noise-prevention condenser, etc.), wind the lead wire and secure it by soldering.

5. Do not let the wiring come into contact with heat-emitting devices (fuse resistor, radiator plate, etc.).

6. When replacing the wiring, make sure that it is not in contact with the unfinished or rough edge of a part.

7. When replacing the power cord (except for the plug-in type), tug it from various directions to confirm that it does not slip out of place.

8. Spacing
   If soldering was done on the AC primary circuit, confirm that the interval between the soldered terminals or between the terminal and surrounding metallic parts is at least the minimum required (Between the primary circuit and the chassis: at least 6.5 mm; between primary circuit terminals: at least 4.0 mm; between primary circuit terminals and secondary circuit terminals: at least 6.5 mm.).

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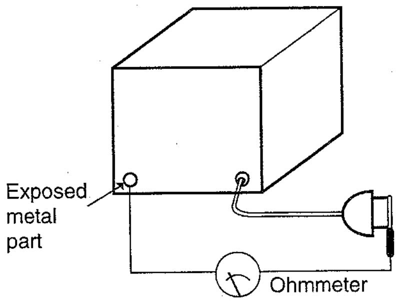
SAFETY PRECAUTION (This "safety precaution" is for the U.S.A. only)

● Safety Precaution

1. Before servicing, unplug the power cord to prevent an electric shock.
2. When replacing parts, use only the manufacturer's recommended components for safety.
3. Check the condition of the power cord. Replace if wear or damage is evident.
4. After servicing, be sure to restore the lead dress, insulation barriers, insulation papers, shields, etc..
5. Before returning the serviced equipment to the customer, be sure to make the following insulation resistance test to prevent the customer from being exposed to a shock hazard.

● Insulation Resistance Test

1. Unplug the power cord and short the two prongs of the plug with a jumper wire.
2. Turn on the power switch.
3. Measure the resistance value with an ohmmeter between the jumpered AC plug and each exposed metal cabinet part, such as screw heads, connectors, control shafts, handle brackets, etc..Measurements should range from 4 MΩ to infinity for all exposed parts.

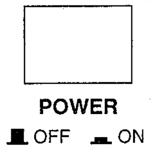


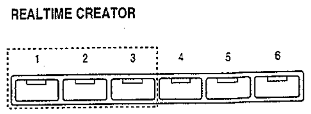
Resistance = 4MΩ to ∞

INITIAL SETTING

■ The initial setting function is used to return to the original factory settings, and to reset the customer settings and misoperations.

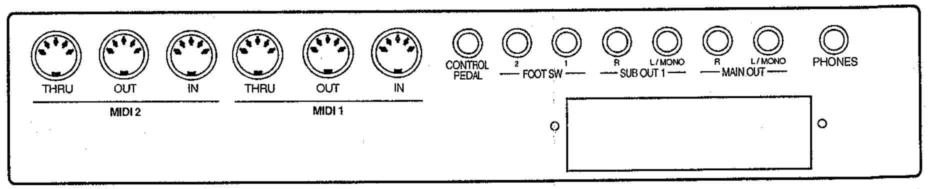
1. Press the **POWER** button to turn off the instrument.
2. While pressing the three leftmost buttons in the **REALTIME CREATOR** section (**1, 2, 3**) at the same time, turn the **POWER** button on again.





NOTE:
All stored data in the **SEQUENCER** and other setting are initialized with this operation.

TERMINALS



(on the rear panel)

MIDI (Musical Instrument Digital Interface)
MIDI is the standard specification that enables connection to equipment such as synthesizers and personal computers. Data transmission and reception are possible between the Technics Keyboard and other instrument provided with MIDI terminals.

IN :	The terminal that receives data from external equipment.
OUT :	The terminal that transmits data from this instrument to external equipment.
THRU:	The terminal that transfers data from the **IN** terminal directly to other equipment.

- Use a 5-pin DIN cord (less than 15 m long) for these connections.

CONTROL PEDAL
The optional SZ-E2 Expression Pedal can be connected to this terminal to control various functions.

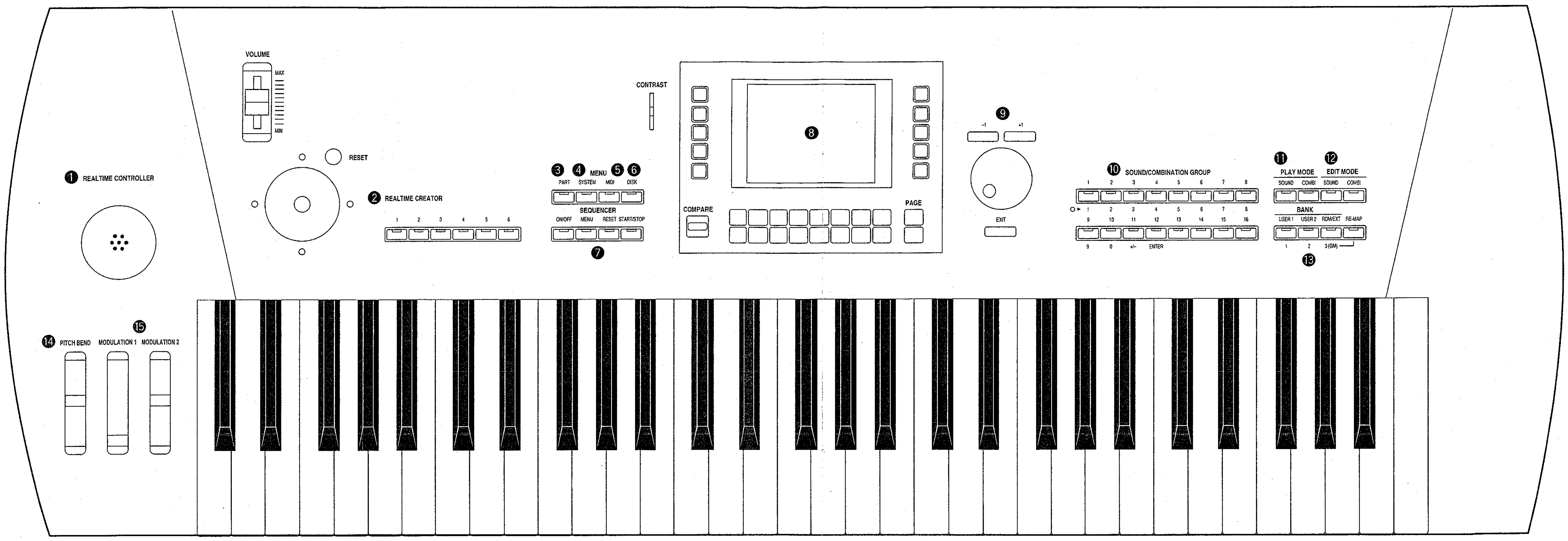
FOOT SW 1, 2
The optional SZ-P1 Foot Switch can be connected to this terminal to control various functions.

SUB OUT 1 (Output level 1.5 Vrms, 600 Ω)
This terminal is for sub output. To output monaural signals, connect the external equipment to the **L/MONO** terminal. (Do not connect the **R** terminal.)

MAIN OUT (Output level 1.5 Vrms, 600 Ω)
This terminal is for main output. To output monaural signals, connect the external equipment to the **L/MONO** terminal. (Do not connect the **R** terminal.)

PHONES (Use headphones with over 16 Ω impedance.)
For silent practice headphones may be used.

ARRANGEMENT OF CONTROL PANEL


VOLUME
MAX
MIN
RESET
① REALTIME CONTROLLER
② REALTIME CREATOR
1 2 3 4 5 6
CONTRAST
③ ④ MENU ⑤ ⑥
PART SYSTEM MIDI DISK
SEQUENCER
ON/OFF MENU RESET START/STOP
⑦
⑧
COMPARE
PAGE
⑨
-1 +1
EXIT
⑩ SOUND/COMBINATION GROUP
1 2 3 4 5 6 7 8
○ ► 1 2 3 4 5 6 7 8
9 10 11 12 13 14 15 16
9 0 +/- ENTER
⑪ ⑫
PLAY MODE EDIT MODE
SOUND COMBI SOUND COMBI
BANK
USER 1 USER 2 ROM/EXT RE-MAP
1 2 3 (GM)
⑬
⑭ PITCH BEND
⑮ MODULATION 1 MODULATION 2

① REALTIME CONTROLLER
Modify the characteristics of the sounds during your performance. When you release your finger from this controller, it returns automatically to the neutral position.

② REALTIME CREATOR
Modify the characteristics of the sounds during your performance. You can return the sound to its original state by pressing the **RESET** button.

③ PART
The settings for each part of this instrument can be adjusted to serve your personal preferences an requirements.

④ SYSTEM
The settings for the whole instrument can be adjusted.

⑤ MIDI
Select the various settings which are used for **MIDI** operation of this instrument.

⑥ DISK
The Disk Drive enables you to store **SEQUENCER** data, sound data, etc. for future use.

⑦ SEQUENCER
Record and play back performances.

⑧ Display
The display shows the status of your performance and the various instrument settings at a glance.

⑨ Data entry controls
Use these controls when setting a function and specifying a numerical value.

⑩ SOUND/COMBINATION GROUP
Select the **SOUND** group or **COMBINATION** group used for your performance.

⑪ PLAY MODE
Two modes are available for playing this instrument.

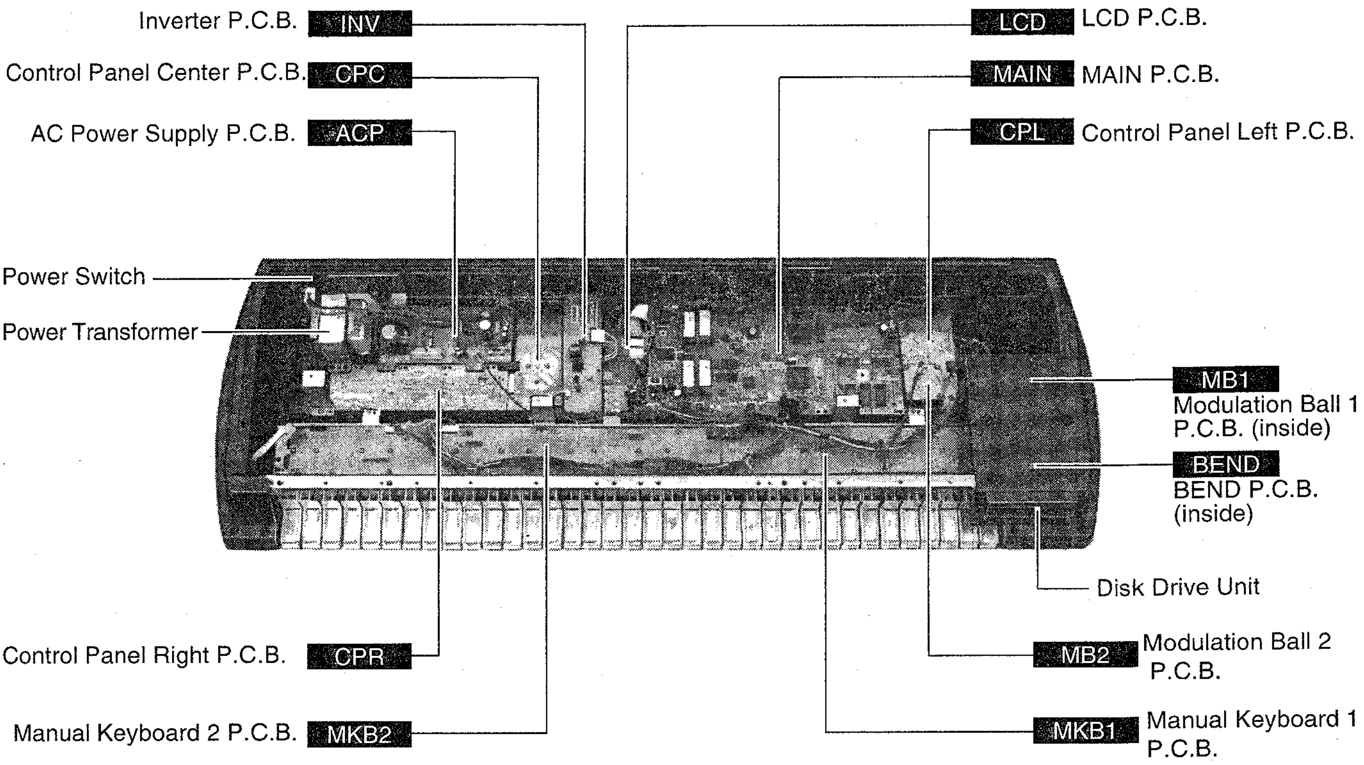
⑫ EDIT MODE
Edit **SOUND** and **COMBINATION**.

⑬ BANK
Select the bank of the **SOUND** or **COMBINATION** used for your performance.

⑭ PITCH BEND
While pressing a key on the keyboard, move this wheel up and down to control the pitch.

⑮ MODULATION 1, 2
While pressing a key on the keyboard, move these wheels to add effects. The **MODULATION 1** effect is off when the wheel is turned all the way down. The **MODLULATION 2** effect is off when the wheel is set to the center.

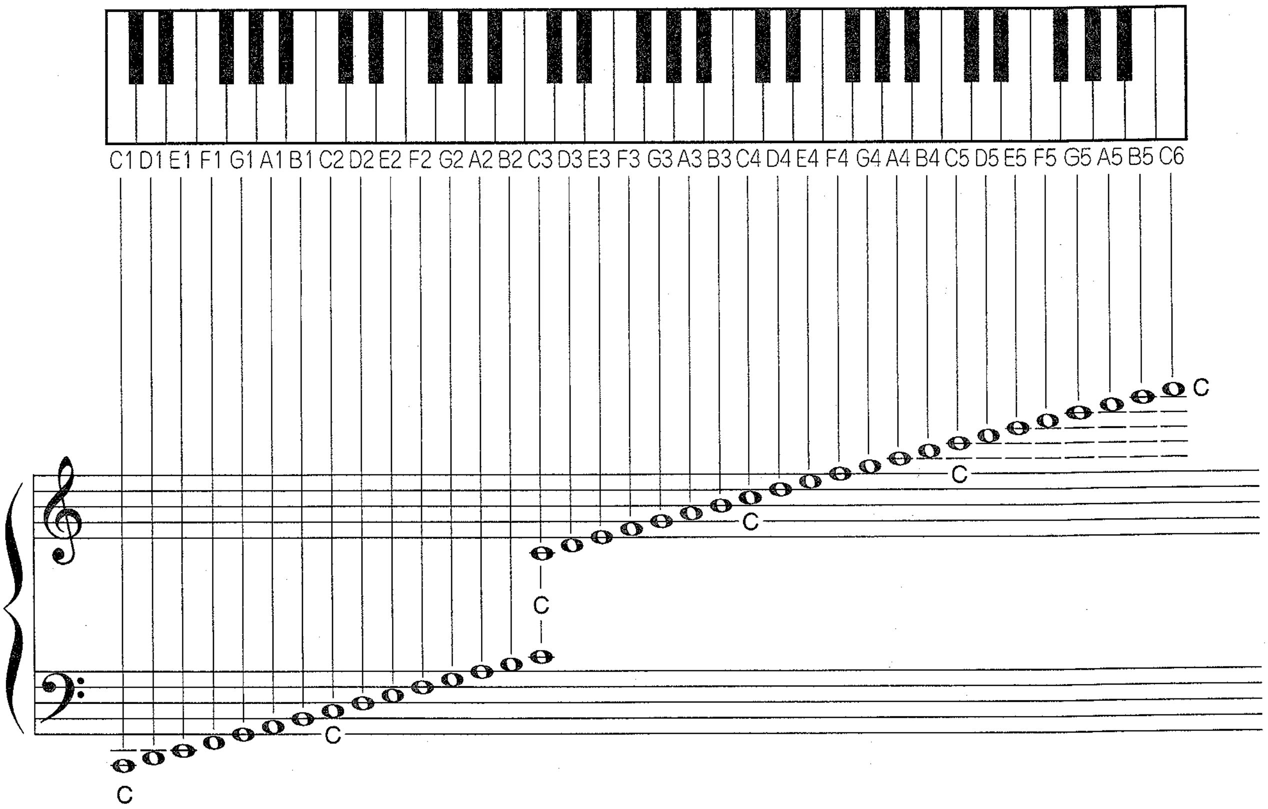
PARTS LOCATION


Inverter P.C.B. INV
Control Panel Center P.C.B. CPC
AC Power Supply P.C.B. ACP
LCD LCD P.C.B.
MAIN MAIN P.C.B.
CPL Control Panel Left P.C.B.
Power Switch
Power Transformer
MB1 Modulation Ball 1 P.C.B. (inside)
BEND BEND P.C.B. (inside)
Disk Drive Unit
Control Panel Right P.C.B. CPR
MB2 Modulation Ball 2 P.C.B.
Manual Keyboard 2 P.C.B. MKB2
MKB1 Manual Keyboard 1 P.C.B.

[Photo-1]

KEYBOARD RANGES

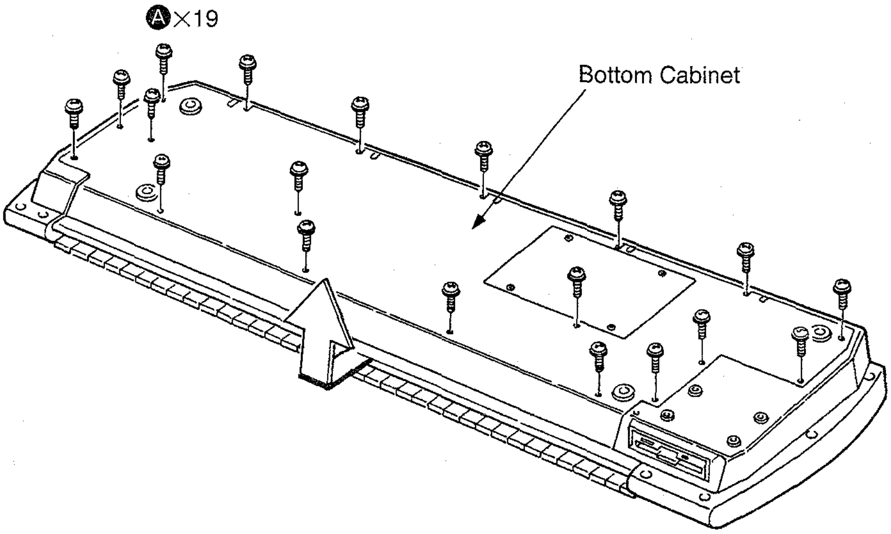
This keyboard features Touch Response, by which you control the volume by playing the keys harder or softer.


C1 D1 E1 F1 G1 A1 B1 C2 D2 E2 F2 G2 A2 B2 C3 D3 E3 F3 G3 A3 B3 C4 D4 E4 F4 G4 A4 B4 C5 D5 E5 F5 G5 A5 B5 C6
C
C
C
C
C

DISASSEMBLY INSTRUCTIONS

1 Opening the cabinet

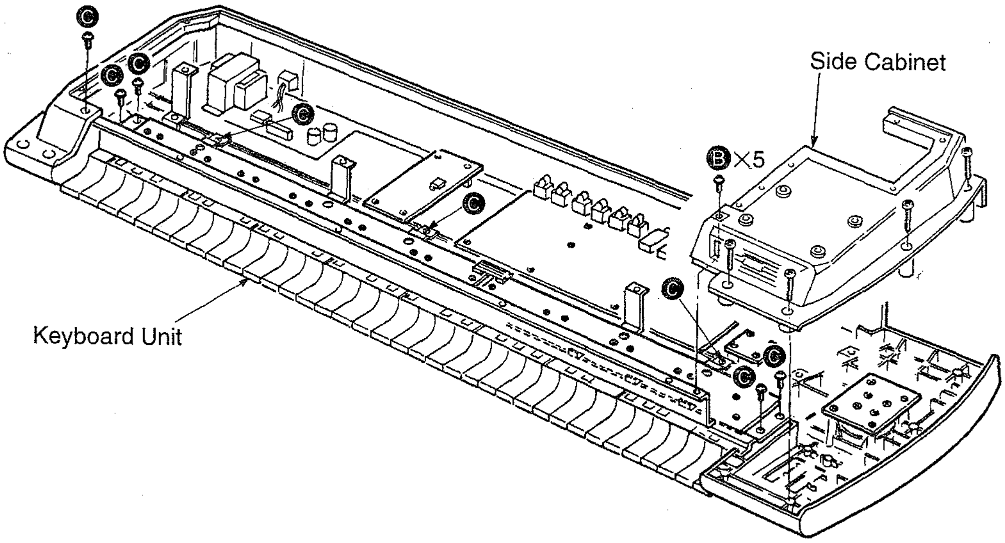
1. Turn the keyboard cabinet upside down as shown in Fig. 1, and remove the bottom screws (Ⓐ 19 pcs.).
2. Slide the bottom cabinet forward to remove it.


Ⓐ×19
Bottom Cabinet

[Fig. 1]

2 Removing the keyboard unit

1. Open the cabinet (see step 1).
2. Remove the side cabinet holding screws (Ⓑ 5 pcs.).
3. Remove the keyboard unit holding screws (Ⓒ 8 pcs.).


Ⓒ
Ⓒ
Ⓒ
Ⓒ
Ⓒ
Side Cabinet
Ⓑ×5
Ⓒ
Ⓒ
Ⓒ
Keyboard Unit

[Fig. 2]

3 Removing the printed circuit boards

- Remove the side cabinet (see step 2).

MAIN P.C.B.

- Remove the MAIN P.C.B. holding screws (🅓 3 pcs. and 🅔 8 pcs.).

MB1 P.C.B.

- Remove the MB1 P.C.B. holding screws (🅕 4 pcs.).

MB2 P.C.B.

- Remove the MB2 P.C.B. holding screws (🅖 4 pcs).

INV P.C.B.

- Remove the INV P.C.B. holding screws (🅗 3 pcs.).

BEND P.C.B.

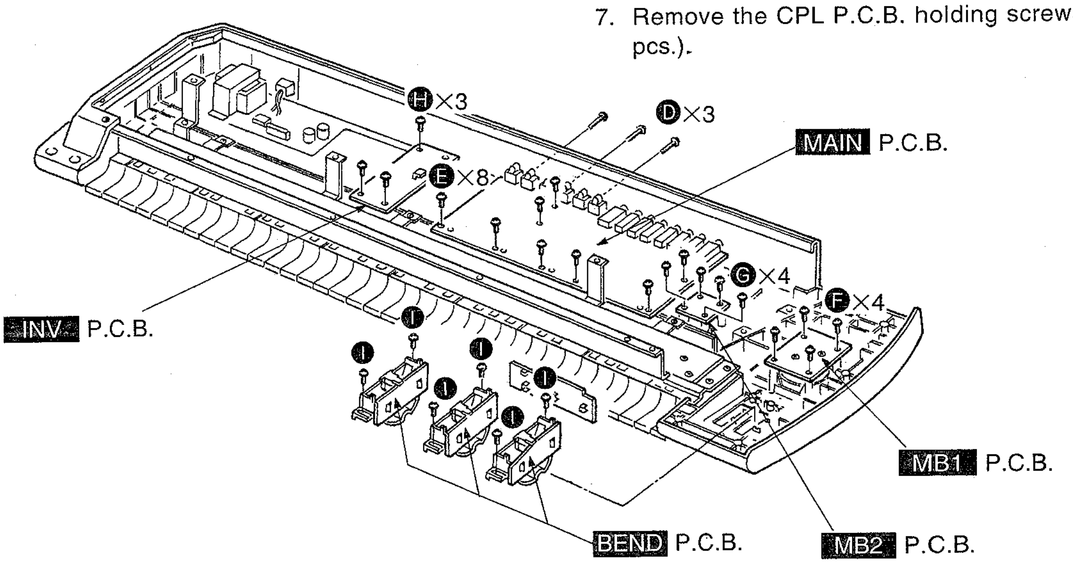
- Remove the BEND P.C.B.s holding screws (🅘 6 pcs.).

ACP P.C.B.

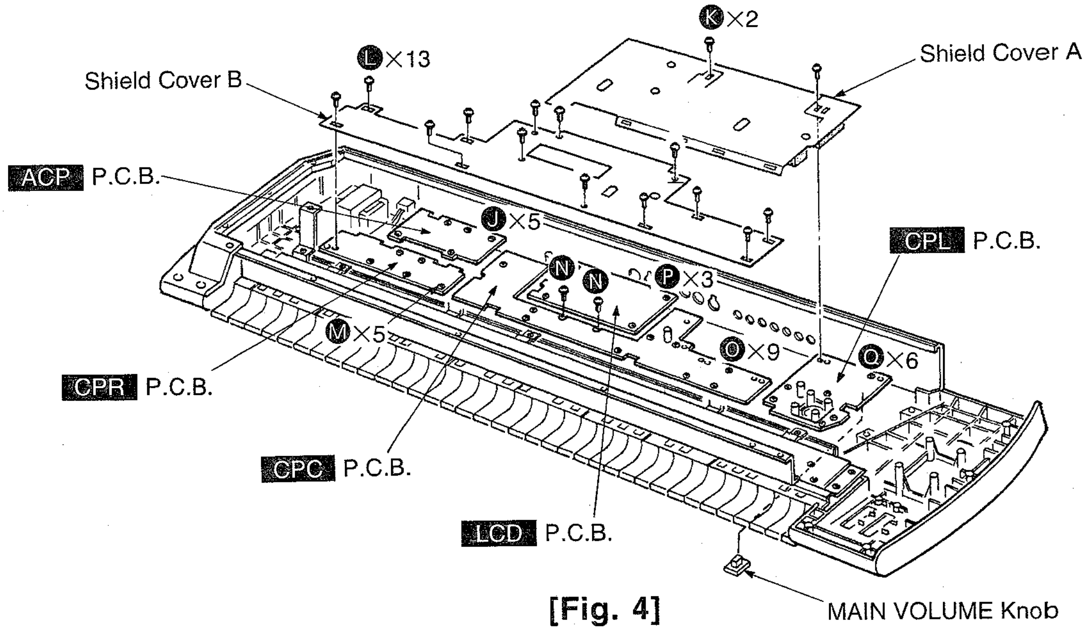
- Remove the ACP P.C.B. holding screws (🅙 5 pcs.).

CPL, CPR, CPC, LCD P.C.B.

1. Remove the MAIN and INV P.C.B..
2. Remove the shield cover A holding screws (🅚 2 pcs.).
3. Remove the shield cover B holding screws (🅛 13 pcs.).
4. Remove the CPR P.C.B. holding screws (🅜 5 pcs.).
5. Remove the CPC and LCD P.C.B. holding screws (🅝 2 pcs., 🅞 9 pcs. and 🅟 3 pcs.).
6. Pull off the **MAIN VOLUME** knob.
7. Remove the CPL P.C.B. holding screws (🅠 6 pcs.).


🅗×3
🅓×3
MAIN P.C.B.
🅔×8
🅖×4
🅕×4
INV P.C.B.
🅘
🅘
🅘
🅘
🅘
🅘
MB1 P.C.B.
BEND P.C.B.
MB2 P.C.B.

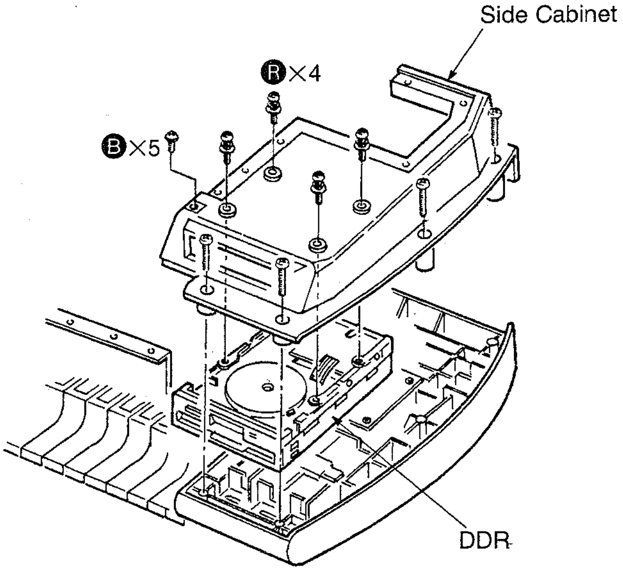
[Fig. 3]


🅚×2
Shield Cover A
🅛×13
Shield Cover B
ACP P.C.B.
🅙×5
CPL P.C.B.
🅝
🅝
🅟×3
🅜×5
🅞×9
🅠×6
CPR P.C.B.
CPC P.C.B.
LCD P.C.B.
MAIN VOLUME Knob

[Fig. 4]

4 Removing the digital disk recorder (DDR)

1. Remove the side cabinet (see step 2).
2. Remove the DDR mounting screws (🅡 4 pcs.).

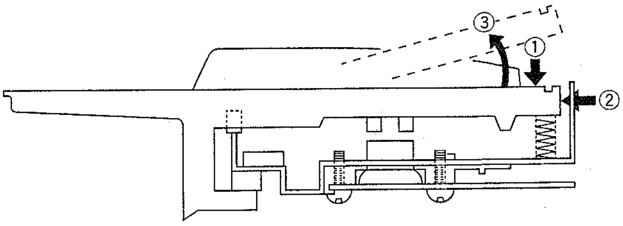


[Fig. 5]

5 Removing the keys (s)

1. Remove the keyboard unit (see step 2).
2. Press downward on the rear of the key (Fig. 6-①).
3. While pressing downward on the rear of the key, push the key forward and release it from the chassis (Fig. 6-②).
4. Lift the key and remove it from the chassis (Fig. 6-③).

NOTE:
To remove a black key, the white key to either side of it should be removed first.



[Fig. 6]

MEASUREMENTS AND ADJUSTMENTS

ADJUSTMENT	MEASURING CONDITIONS	EQUIPMENT	ADJUSTMENT P.C.B.	ADJ. POINT	CONNECT METER TO	METER READING
AFTER TOUCH SENSOR Sensitivity	any position	Oscilloscope	MKB2 P.C.B.	VR1	CN5-3pin	5.0V
	1. Press one of the any keys hardly and check the CN5-3pin voltage. The voltage will increase and became steady. 2. Adjust the voltage to 5.0V with VR1 at that time.					

SYMPTOMS WHICH APPEAR TO BE SIGNS OF TROUBLE

The following changes in performance may occur in the Technics Keyboard but do not indicate trouble.

	Phenomenon	Remedy
Sounds and effects	The buttons, keys, etc. malfunction.	• Turn off the **POWER** button once, then turn it on again. If this procedure is not successful, turn off the **POWER** button once. Then, while pressing the **REALTIME CREATOR 1**, **2** and **3** buttons at the same time (**WSA1**) or the **REALTIME CREATOR 1-6** button and **RESET** button at the same time (**WSA1R**), turn the **POWER** button on again.
	No sound is produced when the keys are pressed.	• The **VOLUME** is at the minimum setting. Adjust the volume with the **VOLUME** control. • The volumes for the selected parts are set to the minimum levels. Set the volumes of the relevant parts to appropriate levels. • The local control for a part performed on the keyboard is set to OFF. Set the local control to ON.
	Only percussive instrument sounds are produced when the keyboard is played.	• The DRUM bank is selected.
	The volume is very low when the keyboard is played.	• The volume setting in the **SEQUENCER** contents is very low. Follow the INITIAL procedure to reset the settings.
	Some sounds cannot be selected.	• When the GENERAL MIDI status is set to on, The sounds which can be selected and operation which can be executed are limited. Turn the GENERAL MIDI status off to return the instrument to its normal operation.
	The sound you hear is different from the sound you selected.	• This sometimes occurs when you play back **SEQUENCER** data which was created on a different model, or when MIDI data is received from a connected instrument. Select the desired sounds again.
	You tried to store an edited sound, but it could not be stored.	• You cannot store a sound if MEMORY PROTECT is set to ON; set it to OFF.
SEQUENCER	Storage is not possible.	• The remaining memory capacity of the **SEQUENCER** is 0. Follow the SONG CLEAR or TRACK CLEAR procedure to erase the memory.
	Multi-track storage is not possible.	• The playback track has been selected, but the **START/STOP** button has not been pressed. To record one track while listening to another (playback) track, press the **START/STOP** button to begin playback.

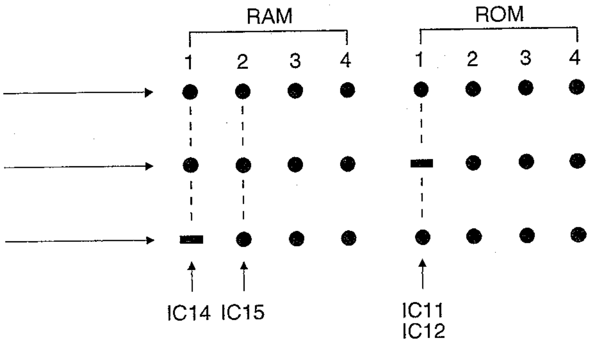
	Phenomenon	Remedy
Disk Drive	The Disk Drive produces a noise during recording or playback.	• This occurs when the Disk Drive is reading a disk. It does not indicate a problem.
	When the procedure to load from a disk is performed, the contents of the keyboard memory are erased.	• When performing the load operation from a disk, the keyboard memory changes to that of the data loaded from the disk. If you wish to preserve a song which is stored in the keyboard memory, save it on a disk before performing the load procedure.
Other	Noise from a radio or TV can be heard.	• This sometimes occurs when electrical equipment such as a radio or TV is used near the instrument. Try moving such electrical equipment further away from the instrument. • The sound may be coming from a nearby broadcast station or amateur radio station. If the sound is bothersome, consult your dealer or service center.
	The cabinet becomes warm during use.	• This instrument has a built-in power source that heats the cabinet to some degree. This is not an indication of trouble.

ERROR DISPLAY

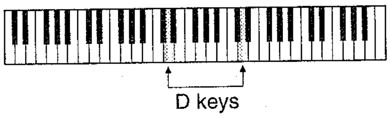
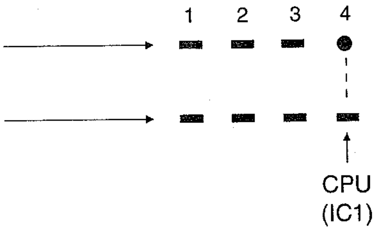
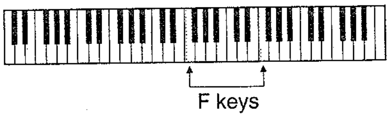
No.	Contents
00	The data on the disk that you are using is for a different product.
01	An error has occurred while the disk was loading. Please try again!
02	There is no disk in the Disk Drive.
03	The file that you tried to load is empty.
05	An error has occurred while the disk was saving. Please try again!
06	The disk that you are using is write protected. Please remove the write protection and try again.
07	The disk that you are using is full. Please use another disk.
08	An error has occurred while the disk was formatting. The disk that you are using may be faulty. Please try formatting another disk.
10	The data is already copy protected.
20	A problem has occurred with your **SEQUENCER** Data. This might be due to a damaged or faulty disk.
21	Memory full
28	This song is too long to be saved as a MIDI file.
29	The MIDI file that you have tried to load exceeds the memory capacity of the **WSA** and cannot be played. The **SEQUENCER** memory has been cleared.
40	The Identification (ID) code of the system exclusive data received by the **WSA** is for a different product.
41	An error has occurred during system exclusive data reception. The data from the transmitting device may be incomplete. Please try again.
42	An error has occurred during system exclusive transmission. The data has not been received correctly. Please try again.
58	The song that you have tried to load exceeds the **WSA**'s available memory and cannot be loaded. The selected song memory has been cleared. Please clear existing songs in the instrument's memory using SONG CLEAR to make more memory available, and try again.

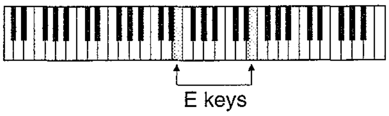
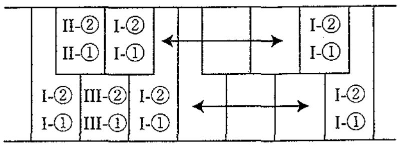
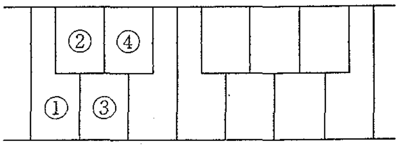
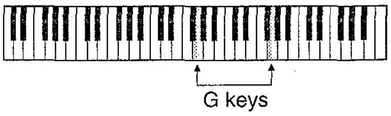
ABOUT THE SELF-DIAGNOSTIC FUNCTION

This model has some self-diagnostic capabilities. When set to the self-diagnostic mode, operation of various components can be verified by following the procedures in the chart below.

<table>
<tr><th>No.</th><th>PCB</th><th>TEST MODE</th><th>Procedure</th></tr>
<tr><td rowspan="2">1</td><td rowspan="2">MAIN</td><td>RAM (IC14, 15), ROM (IC11, 12) check</td><td>1. Connect the CHECKING DEVICE (refer to page I-14) to CN4 on the MAIN P.C.B., and turn on the CHECKING DEVICE switch.
2. Turn on the power switch.</td></tr>
<tr><td colspan="2">When the power switch is turned on, the LED of the CHECKING DEVICE flashes 8 times. The first 4 flashes are for the RAM check, and the latter 4 flashes are for the ROM check. The order of the LED flashes corresponds to the respective IC numbers as shown below. If an IC is defective, the corresponding flash time is longer.
Examples
1. RAM OK, ROM OK
2. RAM OK, ROM (IC11, 12) defective
3. RAM (IC14) defective, ROM OK


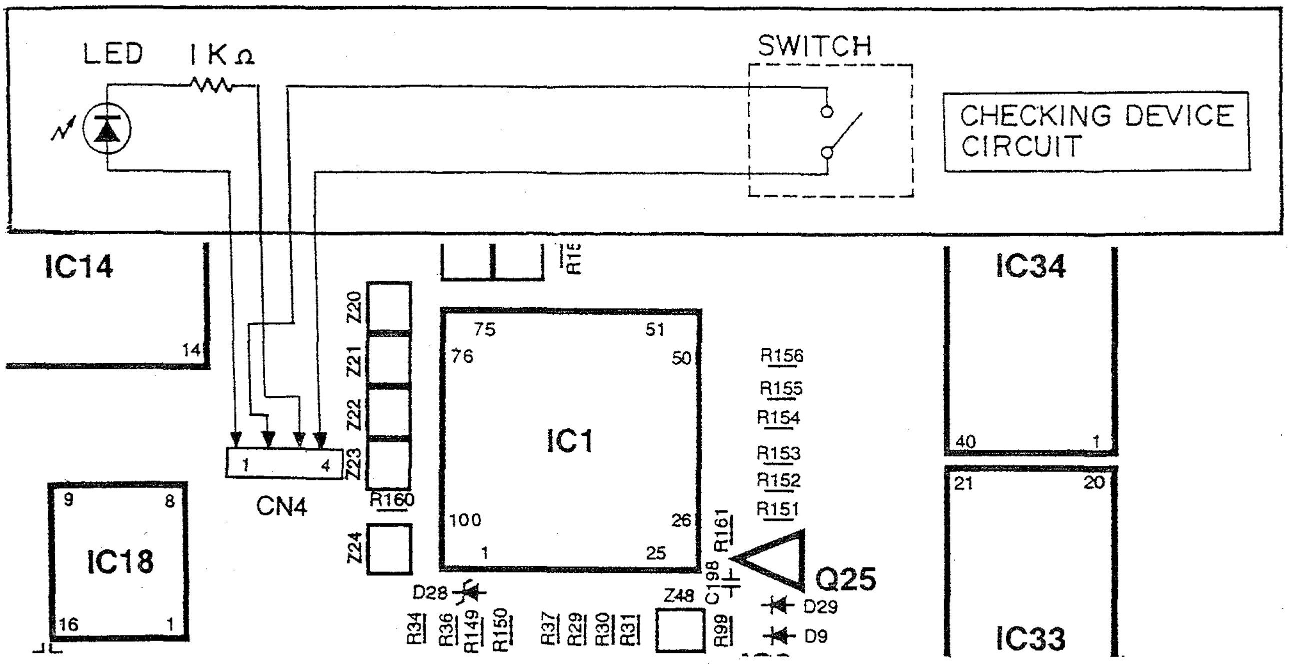
RAM
ROM
1
2
3
4
1
2
3
4
IC14
IC15
IC11
IC12

NOTE : ● indicates short flash time
▬ indicates long flash time</td></tr>
<tr><td rowspan="2">2</td><td rowspan="2">CPC</td><td>CPU (IC1) check</td><td>1. Connect the CHECKING DEVICE to CN4 on the MAIN P.C.B. (The CHECKING DEVICE switch should be off).
2. Press and hold the two D keys shown below, and then turn on the power switch.
 </td></tr>
<tr><td colspan="2">When the power switch is turned on, the LED of the CHECKING DEVICE flashes 4 times. The order of the LED flashes corresponds to the CPU (IC) on the respective P.C.B.s as shown below. If an IC is defective, the corresponding flash time is longer.
1. CPU (IC1) OK
2. CPU (IC1) defective

NOTE : ● indicates short flash time
▬ indicates long flash time</td></tr>
<tr><td rowspan="2">3</td><td rowspan="2">CPL
CPC
CPR</td><td>Control Panel LED check</td><td>Press and hold the two F keys shown below, and then turn on the power switch.
 </td></tr>
<tr><td colspan="2">Press the buttons on the control panel and confirm that the corresponding LEDs light.</td></tr>
</table>

No.	PCB	TEST MODE	Procedure
4	MAIN	Wave ROM check MAIN: IC43-45, 47-49 Generator IC Outsel check	Press and hold the two E keys shown below, and then turn on the power switch. 
		When set to the self-diagnostic mode, the Wave ROM outputs a sine wave. The Wave ROMs correspond to the keyboard keys as shown in the diagram to the right. When a key is pressed, the corresponding sine wave sound is produced. If no sound is produced, or if the sound is distorted, the Wave ROM corresponding to that key is defective.	• The key number indicates the Wave ROM number. (I-①: IC43, I-②: IC47, II-①: IC44, II-②: IC48, III-①: IC45, III-②: IC49)  II-② II-① I-② I-① I-② I-① I-② I-① III-② III-① I-② I-① I-② I-① • Generator IC Outsel check (①: MAIN OUT, ②: SUB OUT 1, ③: SUB OUT 2, ④: SUB OUT 3) 
5	LCD	LCD check	Press and hold the two G keys shown below, and then turn on the power switch. 
		When set to the self-diagnostic mode, the test pattern is shown on the display. Monitor the display to confirm that the characters appear correctly.	

■ Connection between serving CHECKING DEVICE and MAIN P.C.B.

NOTE: The order of the MAIN P.C.B. terminals differs from previous models.



LED
1KΩ
SWITCH
CHECKING DEVICE CIRCUIT
IC14
14
IC34
40
1
21
20
IC33
Z20
Z21
Z22
Z23
Z24
CN4
1
4
R160
IC1
75
51
76
50
100
26
1
25
R156
R155
R154
R153
R152
R151
R161
C198
Q25
Z48
D28
D29
D9
IC18
9
8
16
1
R34
R36
R149
R150
R37
R29
R30
R31
R99

MIDI IMPLEMENTATION CHART

Synthesizer [SX-WSA1] **(Transmitted)**

Function		PART1～32	Remarks
Basic Channel	Default	1–1～2–16	MIDI1: 1–1～1–16, MIDI2: 2–1～2–16
	Changed	1–1～2–16	Single Channel: 1–1～1–16
MODE	Default	3	OMNI OFF, POLY MODE
	Messages	×	
	Altered	–	
Note Number		0–127	
	True Voice	–	
Velocity	Note ON	○	
	Note OFF	×	
After Touch	Key's	×	
	Ch's	○×*	
Pitch Bend		○×*	
Control Change	0,32	○×*	bank select MSB, LSB
	1,2		modulation 1, 2 default
	4		control pedal default
	6,38		data entry MSB, LSB
	7		volume
	10		panpot
	11		expression
	16,17		realtime creator X, Y default
	18,19		realtime controller X, Y default
	64		hold1
	81		realtime creator SW1–6
	91		reverb depth
	93,94		effect1, 2 depth
	100,101		RPN LSB, MSB
	120		all sound off
	121		reset all controllers
Prog Change		○×*	
	True#	–	
System Exclusive		○×*	
System Common	Song Pos	○×*	MIDI 1 only
	Song Sel	○×*	MIDI 1 only
	Tune	×	
System Real time	Clock	○	
	Commands	○×*	
Aux Messages	Local ON/OFF	×	
	ALL notes OFF	×	
	Active Sense	○	
	Reset	×	
Notes		○×*......Whether or not the data for each of these items is transmitted can be set.	

Mode1: OMNI ON,POLY **Mode2:** OMNI ON,MONO

Mode3: OMNI OFF,POLY **Mode4:** OMNI OFF,MONO

○:Yes
×:No

Synthesizer [SX-WSA1] **(Recognized)**

Function		PART1～32	Remarks
Basic Channel	Default	1-1～2-16	MIDI1: 1-1～1-16, MIDI2: 2-1～2-16
	Changed	1-1～2-16	Single Channel: 1-1～1-16
MODE	Default	3	OMNI OFF, POLY MODE
	Messages	×	
	Altered	–	
Note Number		0–127	
	True Voice	12–120 / 0–127	Normal Sound:12–120, Drum Sound:0–127
Velocity	Note ON	○	
	Note OFF	×	
After Touch	Key's	×	
	Ch's	○×*	
Pitch Bend		○×*	
Control Change	0,32	○×*	bank select MSB, LSB
	1,2		modulation 1, 2 default
	4		control pedal default
	6,38		data entry MSB, LSB
	7		volume
	10		panpot
	11		expression
	16,17		realtime creator X, Y default
	18,19		realtime controller X, Y default
	64		hold1
	81		realtime creator SW1–6
	91		reverb depth
	93,94		effect1, 2 depth
	100,101		RPN LSB, MSB
	120		all sound off
	121		reset all controllers
Prog Change		○×*	
	True#	0–127	
System Exclusive		○×*	
System Common	Song Pos	○×*	MIDI 1 only
	Song Sel	○×*	MIDI 1 only
	Tune	×	
System Real time	Clock	○×*	
	Commands	○×*	
Aux Messages	Local ON/OFF	×	
	ALL notes OFF	○	
	Active Sense	○	
	Reset	×	
Notes		○×*......Whether or not the data for each of these items is recognized can be set.	

Mode1: OMNI ON,POLY **Mode2:** OMNI ON,MONO ○:Yes
Mode3: OMNI OFF,POLY **Mode4:** OMNI OFF,MONO ×:No

PRECAUTIONS BEFORE SERVICING

■ Precautions for measuring of the output waveforms.

1. The waveform was measured with a "National Digital Storage Oscilloscope VP-5730A". Therefore the waveforms of musical tone signals shown may differ somewhat due to the difference in the timing of triggering.
2. Since the 1/10 test probe is used, the indicated voltage value on the bottom part of each waveform photo is 1/10 of the actual value (e.g. 0.2 V/cm should be 2.0 V/cm).
3. To measure the waveforms, first set this unit to the self-diagnostic mode (refer to page I-14, No. 4). The Wave ROM output will then be output as a sine wave to facilitate the servicing check.

■ Important safety notice:

Components identified by a ⚠ mark have special characteristics impotant for safety.
When replacing any of these components, use only manufacture's specified parts.

■ Symbolic Marks

The symbolic marks for resistors and capacitors which used in this circuits are classified as following TABLE-1 and TABLE-2.

1. RESISTORS
   - Resistors without symbolic mark are FIXED CARBON FILM RESISTORS (ERD-type).
   - All resistors are 1/4 WATT, ±5 % TOLERANCE unless otherwise designated in schematic diagrams.

(TABLE-1)

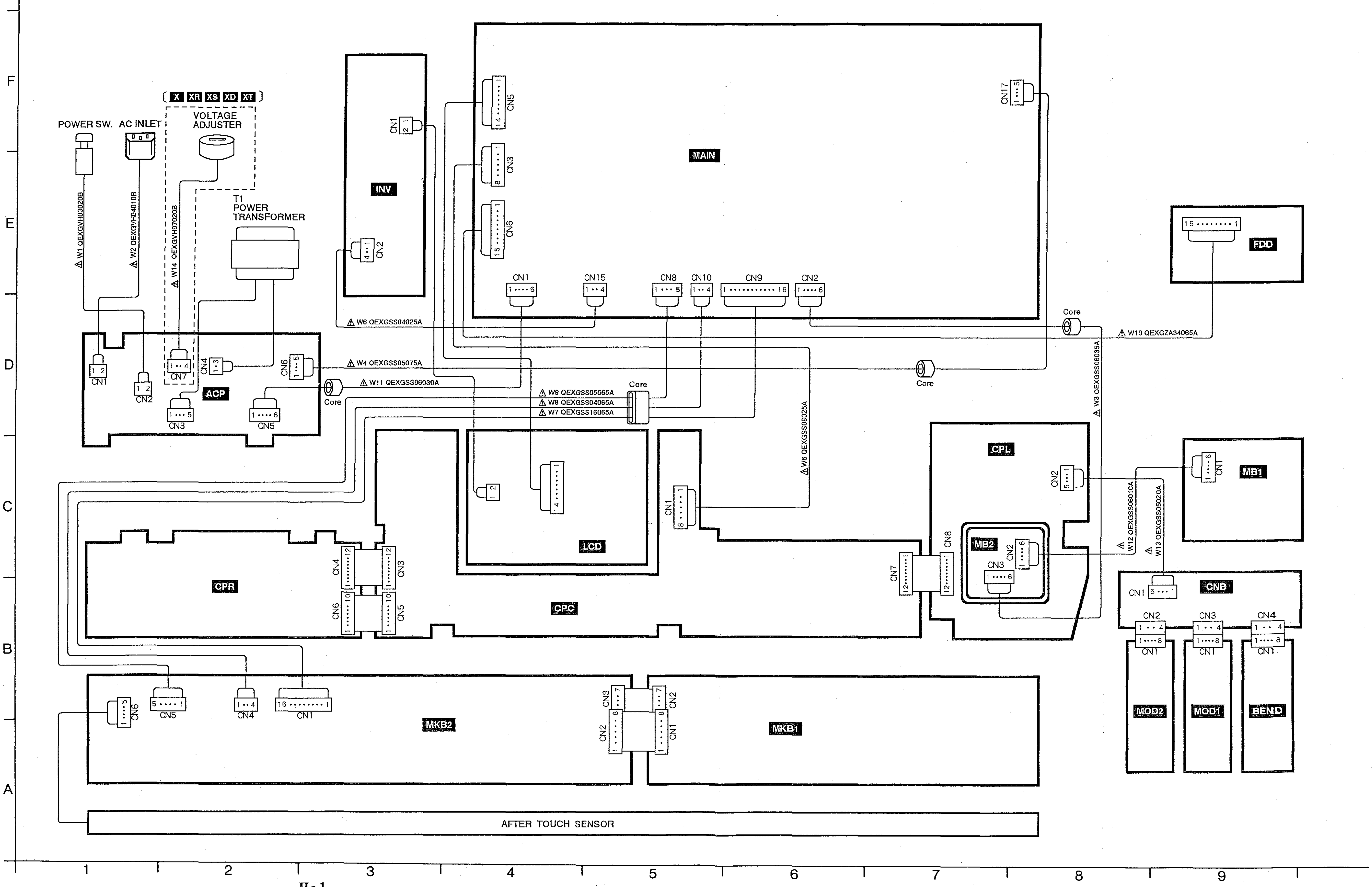
SYMBOL	SPECIFICATION	SYMBOL	SPECIFICATION
Ⓕ	Fixed Carbon Film Resistors "FLAME-PROOF" (ERD—F—type)	Ⓕ	Fixed Metal Film Resistors "FLAME-PROOF" (ERX—type)
Ⓕ	Fixed Wire Wound Resistors "FLAME-PROOF" (ERF—type)	F	Fuse Type Fixed Metal Oxide Film Resistors "FLAME-PROOF" (ERQ—type)
Ⓕ	Fixed Metal Oxide Film Resistors "FLAME-PROOF" (ERG—type)	F	Fuse Type Fixed Carbon File Resistors "FLAME-PROOF" (ERD2FC—type)
Ⓖ	Fixed Metal Film Resistors (Precision and High Stability) (ERO—type)		

2. CAPACITORS
   - Capacitors without symbolic mark are POLYESTER CAPACITORS. (ECQM-type, ECQG-type, ±10 % Tolerance)
   - Polarized capacitors without symbolic mark are Aluminum Electrolytic Capapcitors. (ECEA-type, ±20 % Tolerance)

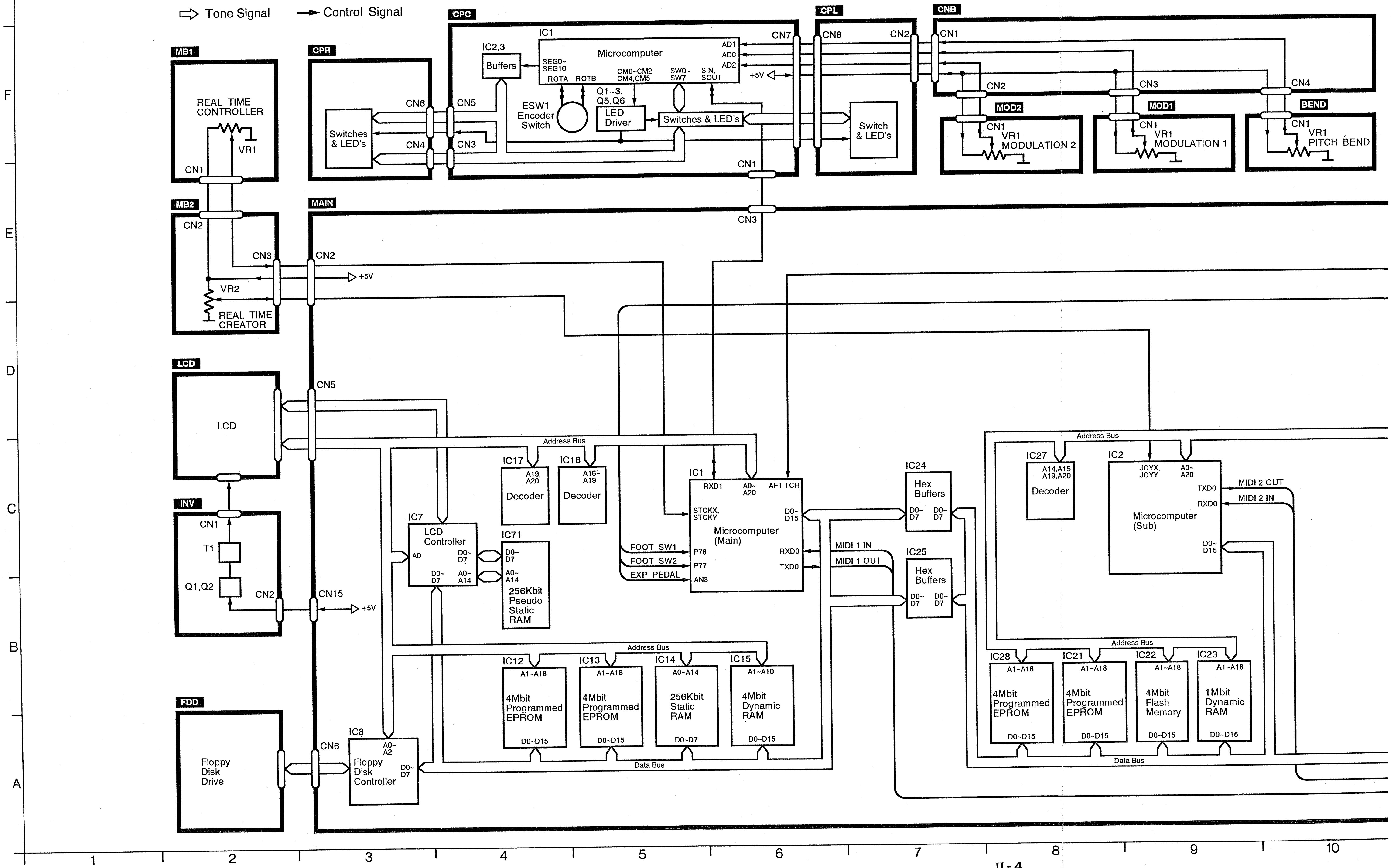
(TABLE-2)

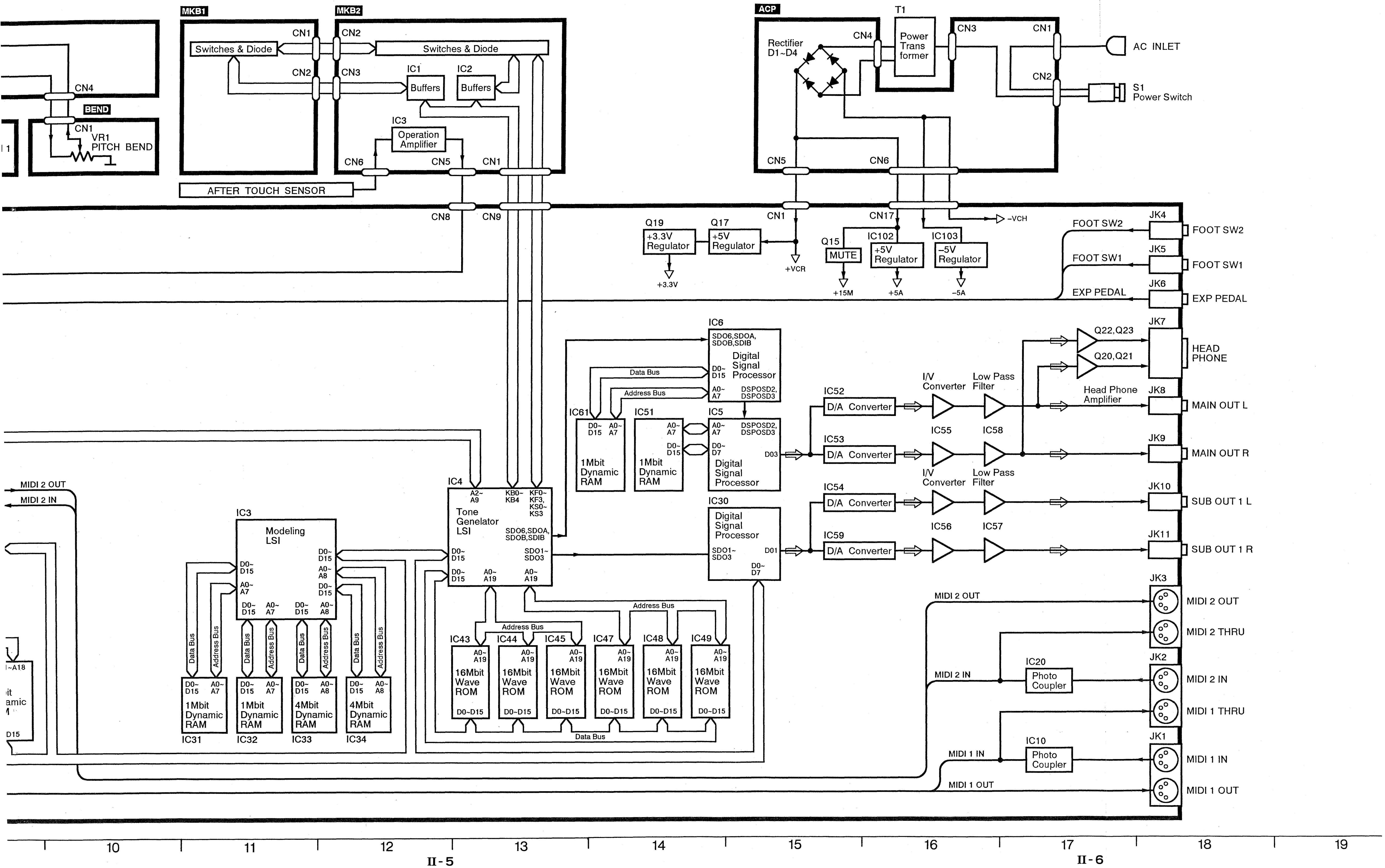
SYMBOL	SPECIFICATION	TYPE
Ⓝ	Non-Polarized Electrolytic Capacitors	ECEA_KN_type
Ⓨ	Non-Polarized Electrolytic (for Network system)	ECEA_Y_type
Ⓣ	Tantalum Solid Electrolytic Capacitors	ECS_type
(TF)	Metalized Plastic Film Capacitors (TF Series)	ECQV_type
○	Temperature Compensating Ceramic Capacitors	ECC_type
	High-Dielectric Constant Ceramic Capacitors	ECK_type ECR_type
	Axial Lead Ceramic Capacitors	ECB_type
	Metalized Polyester Film Capacitors for Across the Line	ECQ_EW_type
	Aluminum Electrolytic Capacitors for Smoothing Circuit	ECES_type
	Multilayer Ceramic Chip Capacitors	ECUV_type

WIRING CONNECTION Diagram

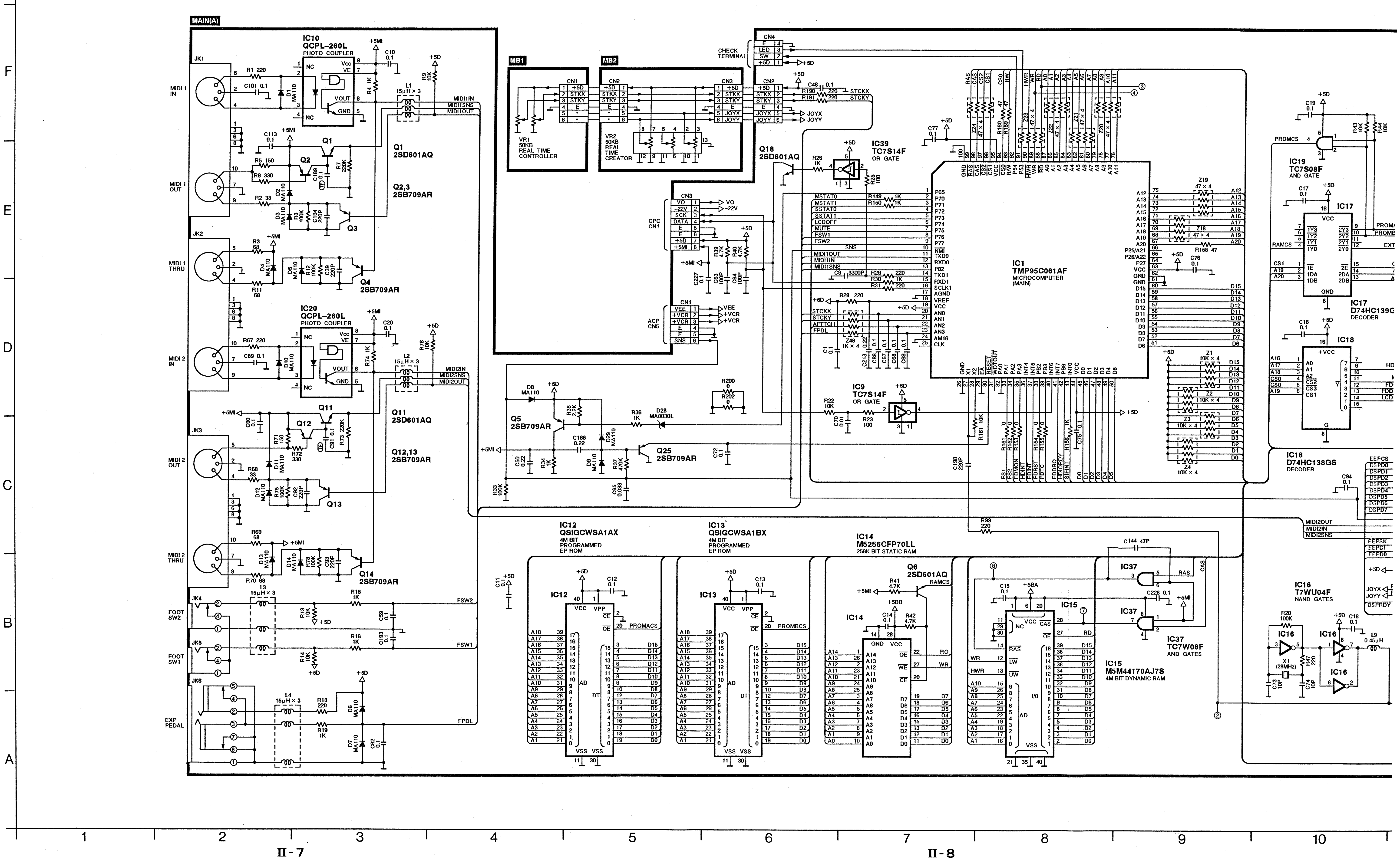

F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
POWER SW.
AC INLET
X XR XS XD XT
VOLTAGE ADJUSTER
T1 POWER TRANSFORMER
⚠ W1 QEXGVH03020B
⚠ W2 QEXGVH04010B
⚠ W14 QEXGVH07020B
ACP
CN1 1 2
CN2 1 2
CN7 1 •• 4
CN4 1 • 3
CN6 1 ••• 5
CN3 1 ••• 5
CN5 1 •••• 6
INV
CN1 2 1
CN2 4 •• 1
MAIN
CN5 14 ••••••• 1
CN3 8 ••••• 1
CN6 15 ••••••• 1
CN17 1 ••• 5
CN1 1 •••• 6
CN15 1 •• 4
CN8 1 ••• 5
CN10 1 •• 4
CN9 1 ••••••••••• 16
CN2 1 •••• 6
FDD
15 ••••••••• 1
Core
⚠ W6 QEXGSS04025A
⚠ W10 QEXGZA34065A
⚠ W4 QEXGSS05075A
⚠ W11 QEXGSS06030A
⚠ W9 QEXGSS05065A
⚠ W8 QEXGSS04065A
⚠ W7 QEXGSS16065A
⚠ W5 QEXGSS08025A
⚠ W3 QEXGSS06035A
⚠ W12 QEXGSS06010A
⚠ W13 QEXGSS05020A
LCD
1 2
14 ••••• 1
CN1 8 •••• 1
CPL
CN2 5 ••• 1
CN8 12 •••••• 1
CN7 12 •••••• 1
MB2
CN2 1 •••• 6
CN3 1 •••• 6
MB1
CN1 1 ••• 6
CNB
CN1 5 ••• 1
CN2 1 •• 4
CN3 1 •• 4
CN4 1 •• 4
CN1 1 •••• 8
MOD2
MOD1
BEND
CPR
CN4 1 •••••• 12
CN6 1 •••••• 10
CPC
CN3 1 •••••• 12
CN5 1 •••••• 10
MKB2
CN6 1 ••• 5
CN5 5 •••• 1
CN4 1 •• 4
CN1 16 ••••••••• 1
CN3 7
CN2 1 •••• 8
MKB1
CN2 7
CN1 1 •••• 8
AFTER TOUCH SENSOR

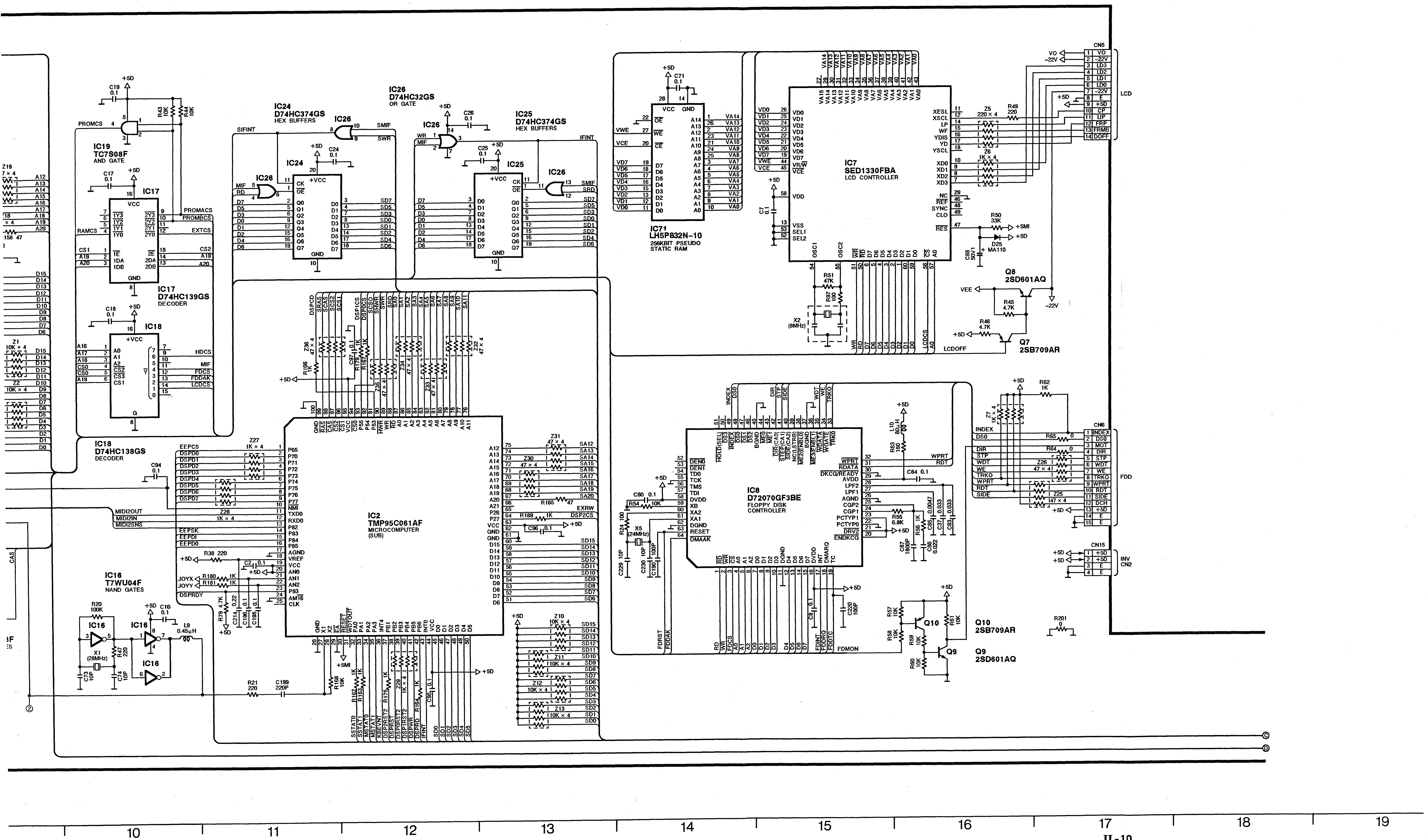
BLOCK Diagram


Tone Signal
Control Signal
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
MB1
REAL TIME CONTROLLER
VR1
CN1
MB2
CN2
CN3
VR2
REAL TIME CREATOR
CPR
Switches & LED's
CN6
CN4
CPC
CN5
CN3
IC2,3
Buffers
IC1
Microcomputer
SEG0~ SEG10
ROTA
ROTB
CM0~CM2 CM4,CM5
SW0~ SW7
SIN, SOUT
AD1
AD0
AD2
+5V
CN7
ESW1 Encoder Switch
Q1~3, Q5,Q6
LED Driver
Switches & LED's
CN1
CPL
CN8
CN2
Switch & LED's
CNB
CN1
CN2
CN3
CN4
MOD2
CN1
VR1
MODULATION 2
MOD1
CN1
VR1
MODULATION 1
BEND
CN1
VR1
PITCH BEND
MAIN
CN2
+5V
CN3
LCD
LCD
CN5
INV
CN1
T1
Q1,Q2
CN2
CN15
+5V
FDD
Floppy Disk Drive
CN6
Address Bus
IC17
A19, A20
Decoder
IC18
A16~ A19
Decoder
IC7
LCD Controller
A0
D0~ D7
D0~ D7
A0~ A14
IC71
D0~ D7
A0~ A14
256Kbit Pseudo Static RAM
IC1
RXD1
A0~ A20
AFT TCH
STCKX, STCKY
D0~ D15
Microcomputer (Main)
FOOT SW1
FOOT SW2
EXP PEDAL
P76
P77
AN3
RXD0
TXD0
MIDI 1 IN
MIDI 1 OUT
Address Bus
IC12
A1~A18
4Mbit Programmed EPROM
D0~D15
IC13
A1~A18
4Mbit Programmed EPROM
D0~D15
IC14
A0~A14
256Kbit Static RAM
D0~D7
IC15
A1~A10
4Mbit Dynamic RAM
D0~D15
Data Bus
IC8
A0~ A2
Floppy Disk Controller
D0~ D7
IC24
Hex Buffers
D0~ D7
D0~ D7
IC25
Hex Buffers
D0~ D7
D0~ D7
Address Bus
IC27
A14,A15 A19,A20
Decoder
IC2
JOYX, JOYY
A0~ A20
TXD0
RXD0
MIDI 2 OUT
MIDI 2 IN
Microcomputer (Sub)
D0~ D15
Address Bus
IC28
A1~A18
4Mbit Programmed EPROM
D0~D15
IC21
A1~A18
4Mbit Programmed EPROM
D0~D15
IC22
A1~A18
4Mbit Flash Memory
D0~D15
IC23
A1~A18
1Mbit Dynamic RAM
D0~D15
Data Bus

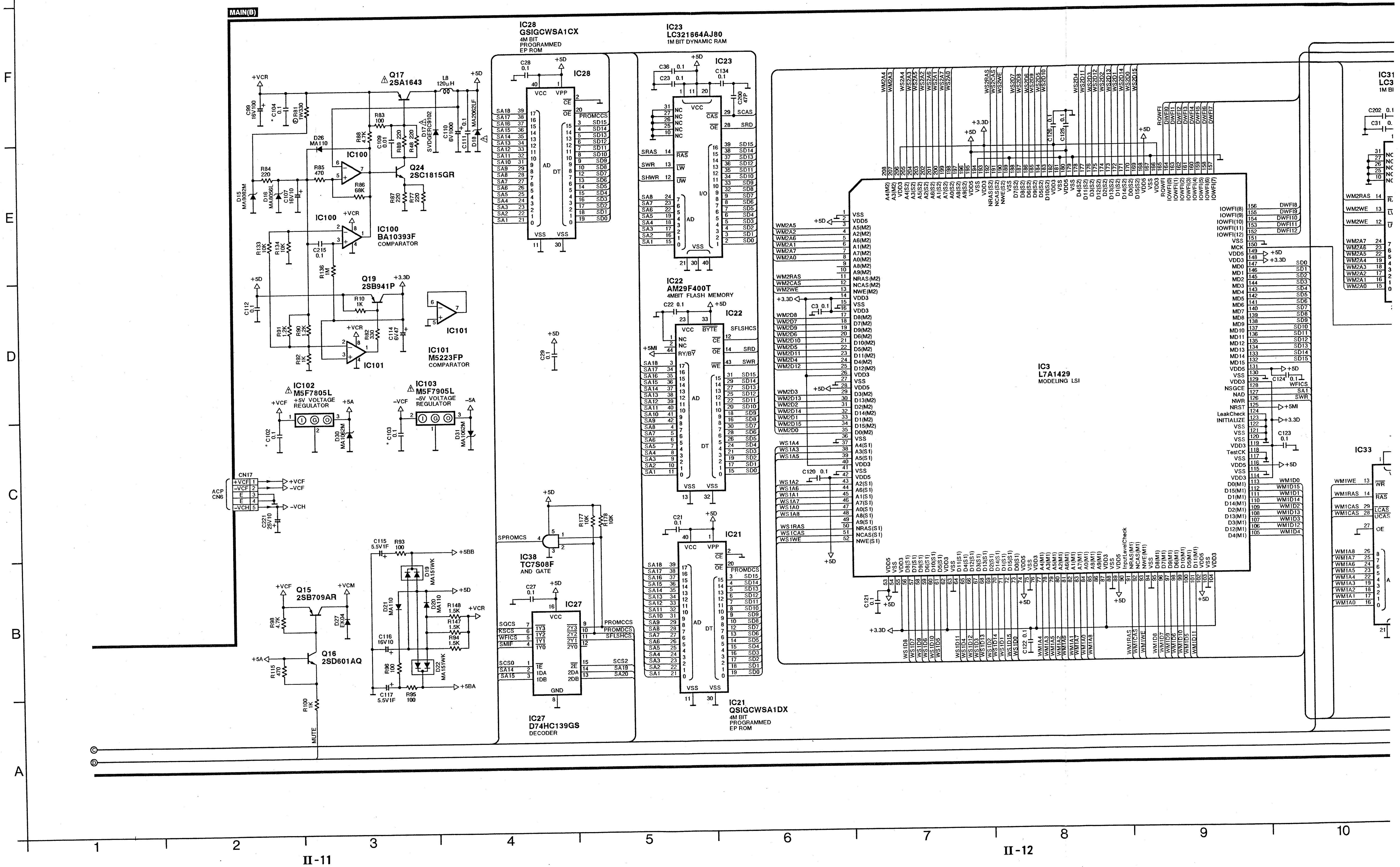

MKB1
Switches & Diode
MKB2
Switches & Diode
IC1 Buffers
IC2 Buffers
IC3 Operation Amplifier
AFTER TOUCH SENSOR
BEND
VR1 PITCH BEND
CN1
CN2
CN3
CN4
CN5
CN6
CN8
CN9
ACP
T1 Power Trans former
Rectifier D1~D4
AC INLET
S1 Power Switch
CN17
-VCH
Q19 +3.3V Regulator
Q17 +5V Regulator
+3.3V
+VCR
Q15 MUTE
+15M
IC102 +5V Regulator
+5A
IC103 -5V Regulator
-5A
FOOT SW2
FOOT SW1
EXP PEDAL
JK4 FOOT SW2
JK5 FOOT SW1
JK6 EXP PEDAL
JK7 HEAD PHONE
Q22,Q23
Q20,Q21
Head Phone Amplifier
JK8 MAIN OUT L
JK9 MAIN OUT R
JK10 SUB OUT 1 L
JK11 SUB OUT 1 R
IC6 Digital Signal Processor
SDO6,SDOA, SDOB,SDIB
D0~D15
A0~A7
DSPOSD2, DSPOSD3
Data Bus
Address Bus
IC61 1Mbit Dynamic RAM
IC51 1Mbit Dynamic RAM
IC5 Digital Signal Processor
D03
IC30 Digital Signal Processor
SDO1~SDO3
D01
IC52 D/A Converter
IC53 D/A Converter
IC54 D/A Converter
IC59 D/A Converter
I/V Converter
Low Pass Filter
IC55
IC58
IC56
IC57
IC4 Tone Generator LSI
A2~A9
KB0~KB4
KF0~KF3, KS0~KS3
A0~A19
IC3 Modeling LSI
D0~D15
A0~A8
IC31 1Mbit Dynamic RAM
IC32 1Mbit Dynamic RAM
IC33 4Mbit Dynamic RAM
IC34 4Mbit Dynamic RAM
IC43 16Mbit Wave ROM
IC44 16Mbit Wave ROM
IC45 16Mbit Wave ROM
IC47 16Mbit Wave ROM
IC48 16Mbit Wave ROM
IC49 16Mbit Wave ROM
MIDI 2 OUT
MIDI 2 IN
MIDI 1 IN
MIDI 1 OUT
JK3 MIDI 2 OUT
MIDI 2 THRU
JK2 MIDI 2 IN
MIDI 1 THRU
JK1 MIDI 1 IN
MIDI 1 OUT
IC20 Photo Coupler
IC10 Photo Coupler
~A18
D15
10
11
12
13
14
15
16
17
18
19

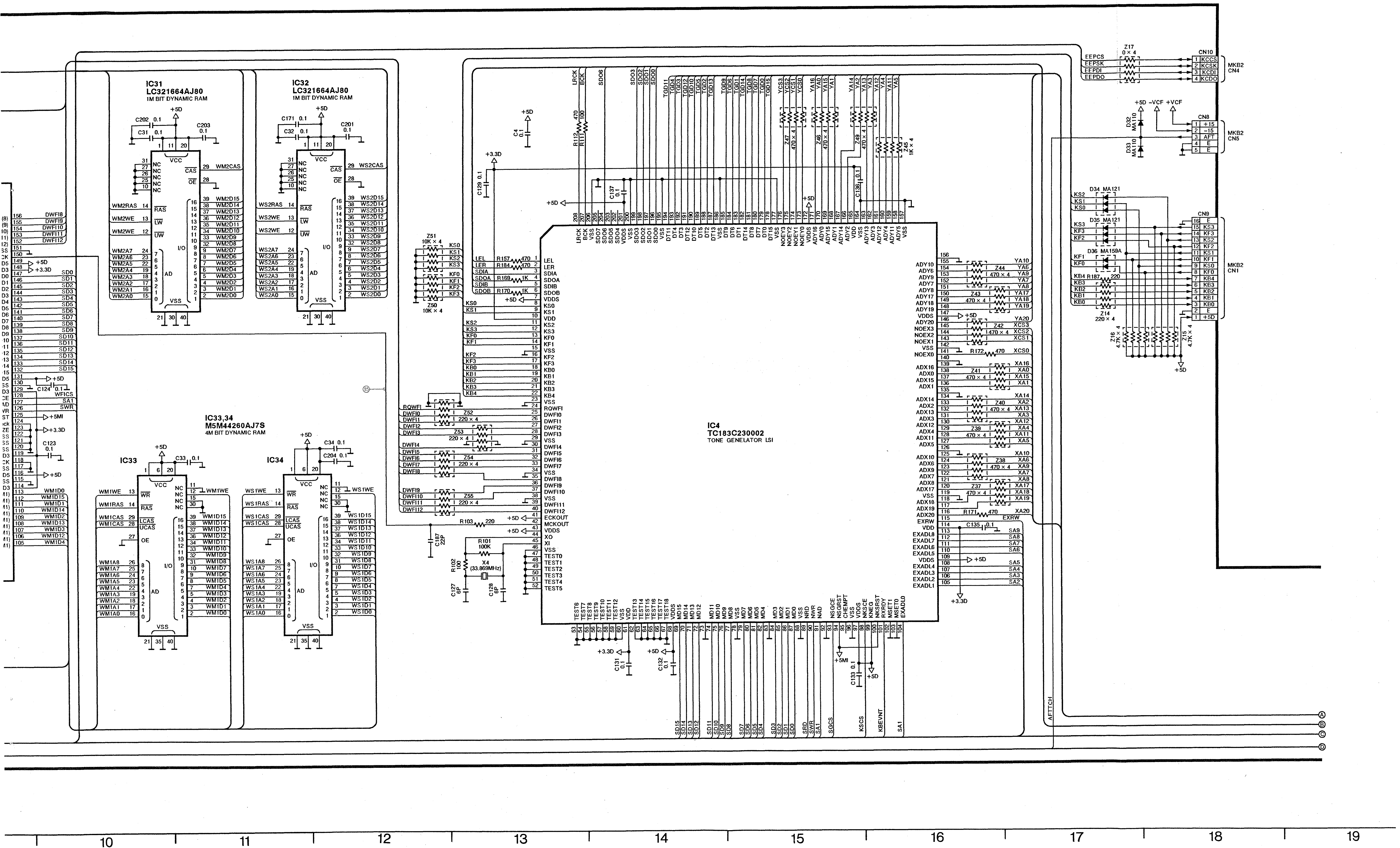
MAIN (A)/MB1/MB2 P.C. Diagram


MAIN(A)
MB1
MB2
JK1
MIDI 1 IN
MIDI 1 OUT
JK2
MIDI 1 THRU
MIDI 2 IN
JK3
MIDI 2 OUT
MIDI 2 THRU
JK4
FOOT SW2
JK5
FOOT SW1
JK6
EXP PEDAL
IC10 QCPL-260L PHOTO COUPLER
IC20 QCPL-260L PHOTO COUPLER
Q1 2SD601AQ
Q2,3 2SB709AR
Q4 2SB709AR
Q11 2SD601AQ
Q12,13 2SB709AR
Q14 2SB709AR
Q5 2SB709AR
Q25 2SB709AR
Q18 2SD601AQ
Q6 2SD601AQ
L1 15μH × 3
L2 15μH × 3
L3 15μH × 3
L4 15μH × 3
MIDI1IN
MIDI1SNS
MIDI1OUT
MIDI2IN
MIDI2SNS
MIDI2OUT
FSW2
FSW1
FPDL
VR1 50KB REAL TIME CONTROLLER
VR2 50KB REAL TIME CREATOR
CN1
CN2
CN3
CN4
CHECK TERMINAL
CPC CN1
ACP CN5
STCKX
STCKY
JOYX
JOYY
IC39 TC7S14F OR GATE
IC9 TC7S14F OR GATE
IC1 TMP95C061AF MICROCOMPUTER (MAIN)
IC19 TC7S08F AND GATE
IC17 D74HC139G DECODER
IC18 D74HC138GS DECODER
IC12 QSIGCWSA1AX 4M BIT PROGRAMMED EP ROM
IC13 QSIGCWSA1BX 4M BIT PROGRAMMED EP ROM
IC14 M5256CFP70LL 256K BIT STATIC RAM
IC15 M5M44170AJ7S 4M BIT DYNAMIC RAM
IC37 TC7W08F AND GATES
IC16 T7WU04F NAND GATES
X1 (28MHz)
L9 0.45μH
PROMACS
PROMBCS
RAMCS
RAS
CAS
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10

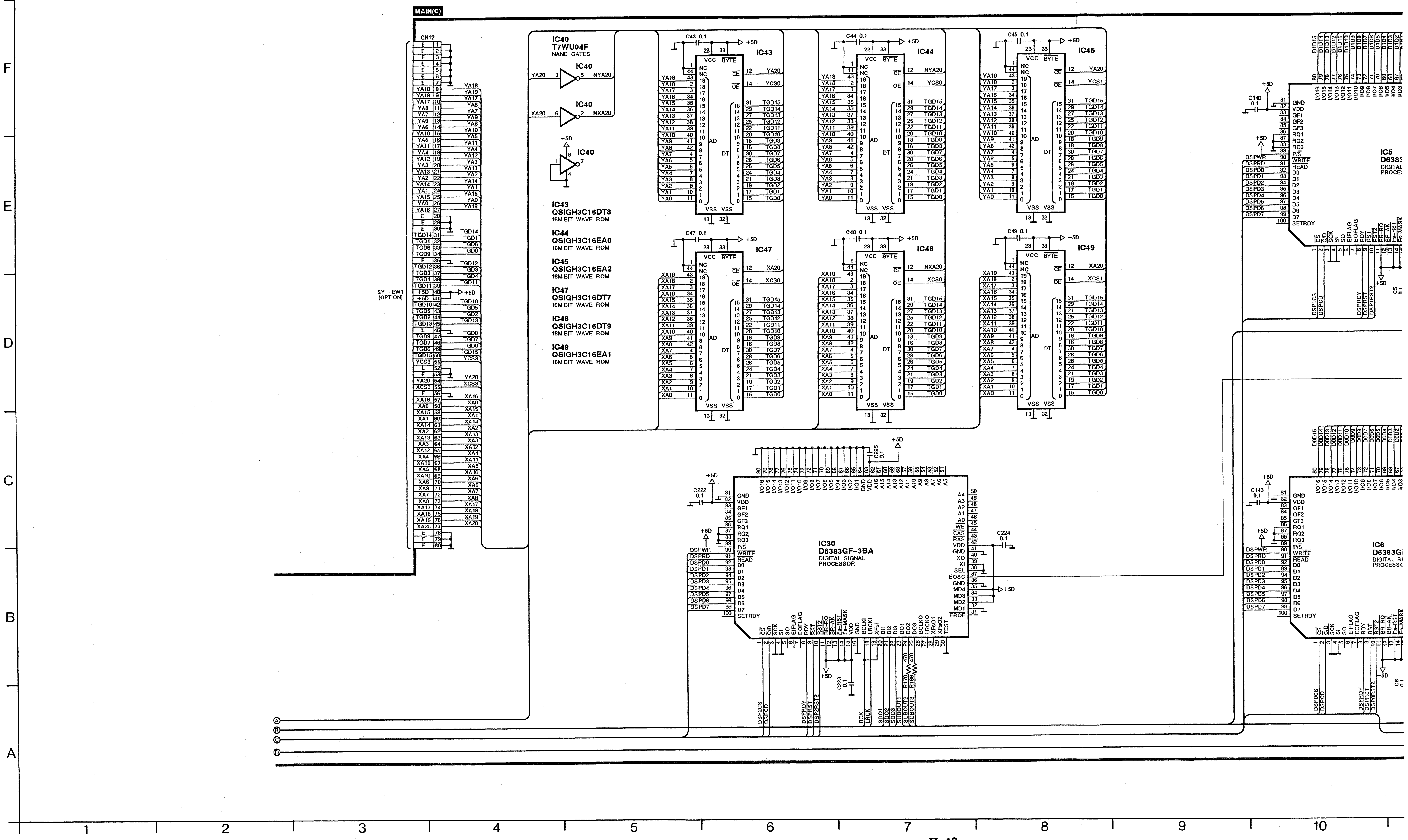

IC19
TC7S08F
AND GATE
IC17
D74HC139GS
DECODER
IC18
IC18
D74HC138GS
DECODER
IC16
T7WU04F
NAND GATES
X1 (28MHz)
IC24
D74HC374GS
HEX BUFFERS
IC26
D74HC32GS
OR GATE
IC25
D74HC374GS
HEX BUFFERS
IC2
TMP95C061AF
MICROCOMPUTER (SUB)
IC71
LH5P832N-10
256KBIT PSEUDO STATIC RAM
IC7
SED1330FBA
LCD CONTROLLER
X2 (8MHz)
Q8
2SD601AQ
Q7
2SB709AR
D25
MA110
CN5
LCD
IC8
D72070GF3BE
FLOPPY DISK CONTROLLER
X5 (24MHz)
Q10
2SB709AR
Q9
2SD601AQ
CN6
FDD
CN15
INV CN2
R201
+5D
+5MI
VEE
-22V
10
11
12
13
14
15
16
17
18
19

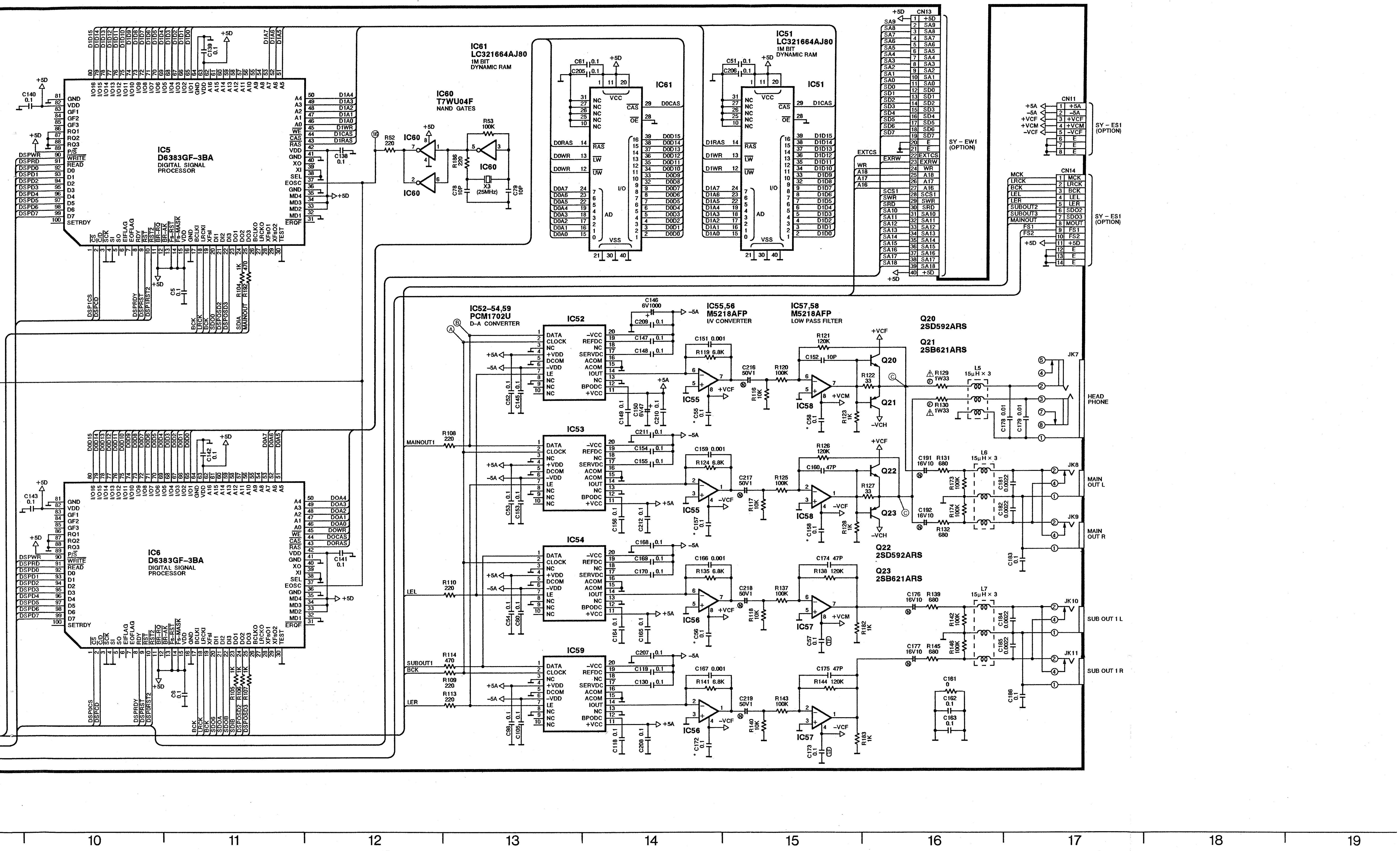
MAIN (B) P.C. Diagram


MAIN(B)
IC28
QSIGCWSA1CX
4M BIT PROGRAMMED EP ROM
IC23
LC321664AJ80
1M BIT DYNAMIC RAM
IC22
AM29F400T
4MBIT FLASH MEMORY
IC21
QSIGCWSA1DX
4M BIT PROGRAMMED EP ROM
IC3
L7A1429
MODELING LSI
IC100
BA10393F
COMPARATOR
IC101
M5223FP
COMPARATOR
IC102
M5F7805L
+5V VOLTAGE REGULATOR
IC103
M5F7905L
-5V VOLTAGE REGULATOR
IC38
TC7S08F
AND GATE
IC27
D74HC139GS
DECODER
Q17
2SA1643
Q24
2SC1815GR
Q19
2SB941P
Q15
2SB709AR
Q16
2SD601AQ
CN17
ACP CN6
+VCF
-VCF
E
-VCH
+VCR
+5D
+3.3D
+5A
-5A
+VCM
+5BB
+5BA
+5MI
MUTE
SPROMCS
PROMCCS
PROMDCS
SFLSHCS
SRAS
SWR
SHWR
SCAS
SRD
IC31
LC3
1M BI
IC33
1
2
3
4
5
6
7
8
9
10
A
B
C
D
E
F


IC31
LC321664AJ80
1M BIT DYNAMIC RAM
IC32
LC321664AJ80
1M BIT DYNAMIC RAM
IC33,34
M5M44260AJ7S
4M BIT DYNAMIC RAM
IC33
IC34
IC4
TC183C230002
TONE GENELATOR LSI
X4 (33.869MHz)
CN10
MKB2 CN4
CN8
MKB2 CN5
CN9
MKB2 CN1
D34 MA121
D35 MA121
D36 MA159A
D32 MA110
D33 MA110
AFTTCH
10
11
12
13
14
15
16
17
18
19

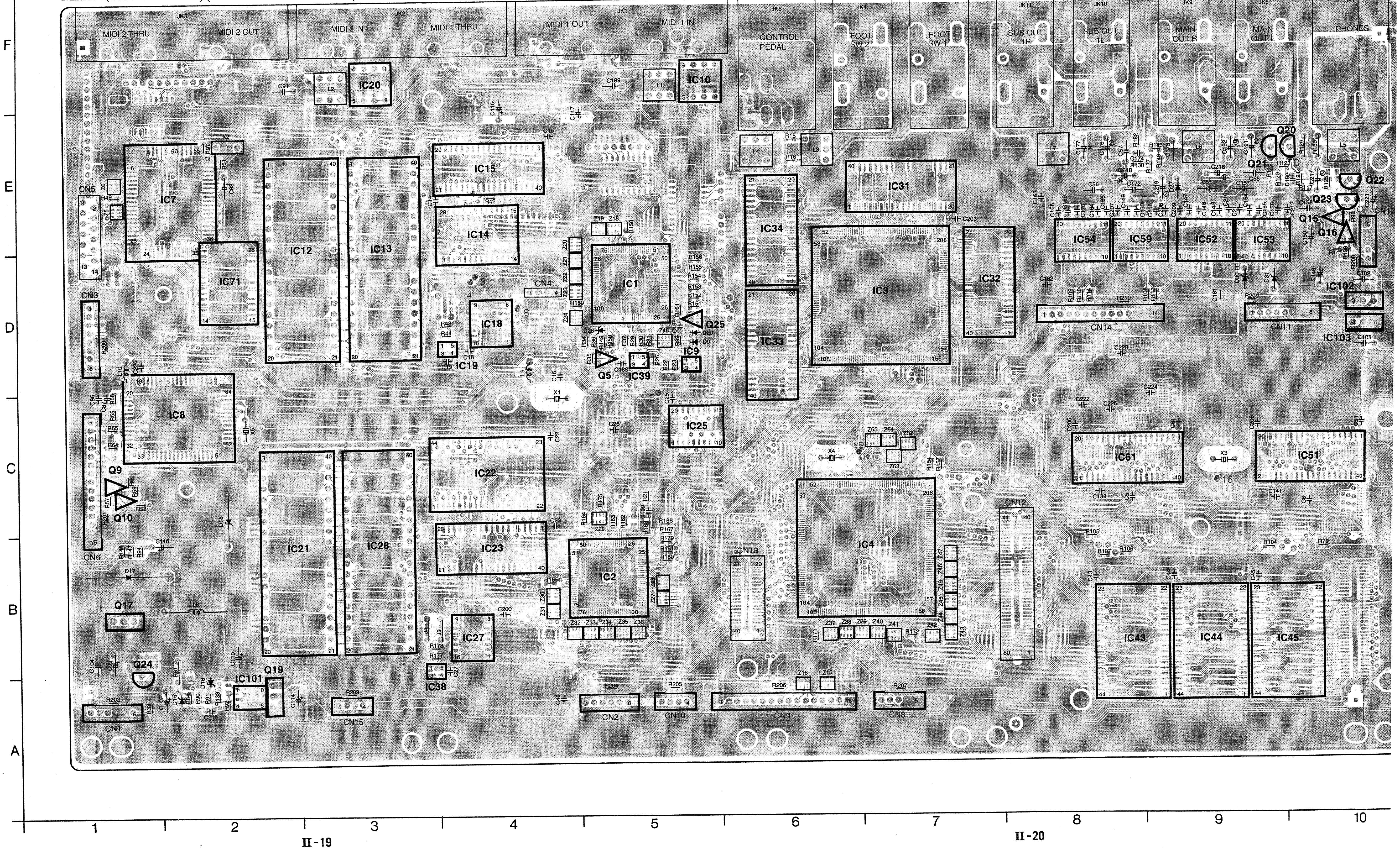
MAIN (C) P.C. Diagram

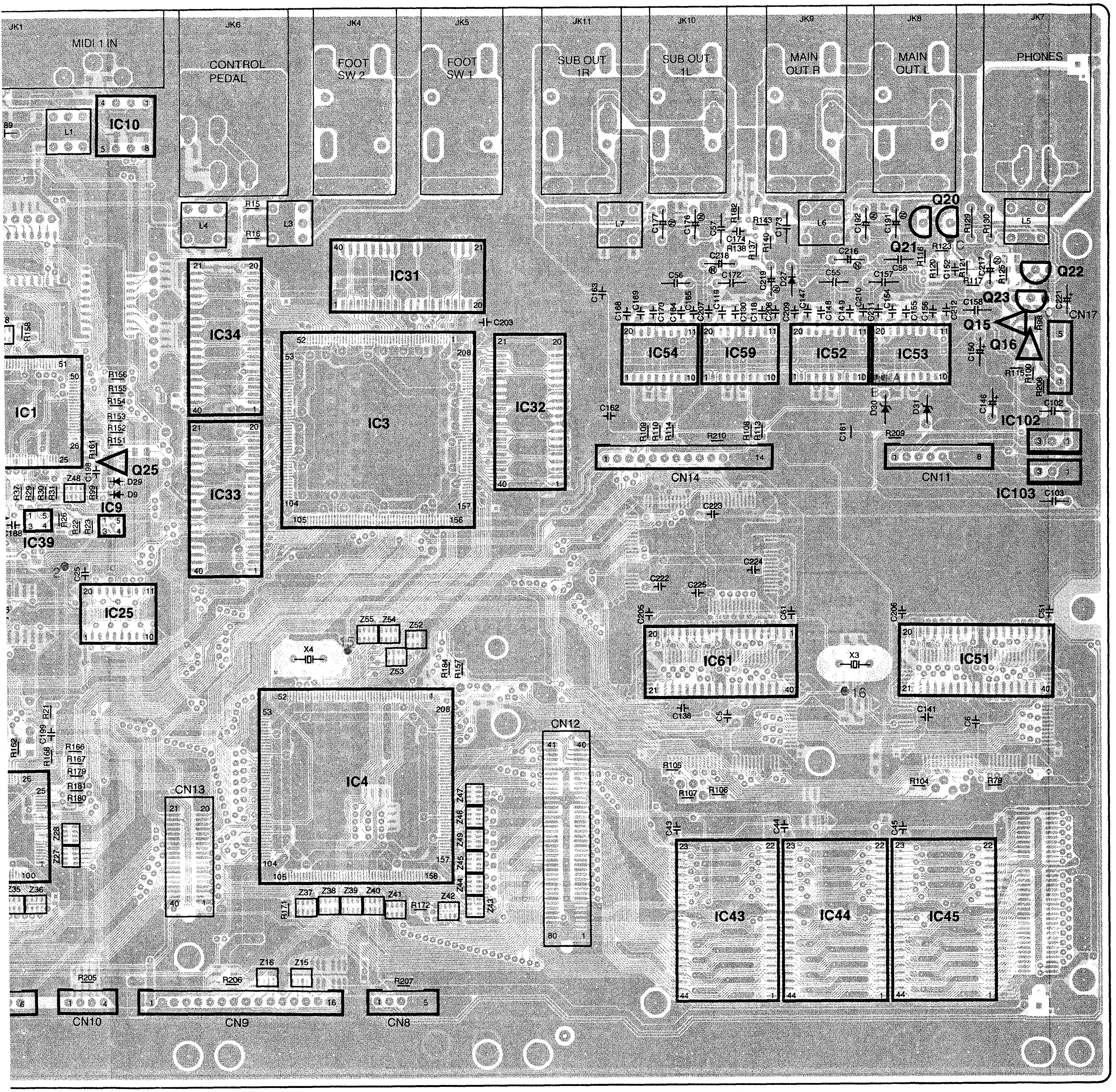

MAIN(C)
CN12
SY - EW1
(OPTION)
IC40
T7WU04F
NAND GATES
IC43
QSIGH3C16DT8
16M BIT WAVE ROM
IC44
QSIGH3C16EA0
16M BIT WAVE ROM
IC45
QSIGH3C16EA2
16M BIT WAVE ROM
IC47
QSIGH3C16DT7
16M BIT WAVE ROM
IC48
QSIGH3C16DT9
16M BIT WAVE ROM
IC49
QSIGH3C16EA1
16M BIT WAVE ROM
IC30
D6383GF-3BA
DIGITAL SIGNAL
PROCESSOR
IC5
IC6
+5D
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10


IC5
D6383GF-3BA
DIGITAL SIGNAL PROCESSOR
IC6
D6383GF-3BA
DIGITAL SIGNAL PROCESSOR
IC61
LC321664AJ80
1M BIT DYNAMIC RAM
IC51
LC321664AJ80
1M BIT DYNAMIC RAM
IC60
T7WU04F
NAND GATES
X3 (25MHz)
CN13
SY-EW1 (OPTION)
CN11
SY-ES1 (OPTION)
CN14
SY-ES1 (OPTION)
IC52~54,59
PCM1702U
D-A CONVERTER
IC52
IC53
IC54
IC59
IC55,56
M5218AFP
I/V CONVERTER
IC57,58
M5218AFP
LOW PASS FILTER
Q20
2SD592ARS
Q21
2SB621ARS
Q22
2SD592ARS
Q23
2SB621ARS
L5 15μH × 3
L6 15μH × 3
L7 15μH × 3
JK7
HEAD PHONE
JK8
MAIN OUT L
JK9
MAIN OUT R
JK10
SUB OUT 1 L
JK11
SUB OUT 1 R
MAINOUT1
LEL
SUBOUT1
BCK
LER
10
11
12
13
14
15
16
17
18
19

MAIN (COMPONENT SIDE) P.C. Board

MAIN(SXPG223011)(COMPONENT SIDE)


JK3
MIDI 2 THRU
MIDI 2 OUT
JK2
MIDI 2 IN
MIDI 1 THRU
JK1
MIDI 1 OUT
MIDI 1 IN
JK6
CONTROL PEDAL
JK4
FOOT SW 2
JK5
FOOT SW 1
JK11
SUB OUT 1R
JK10
SUB OUT 1L
JK9
MAIN OUT R
JK8
MAIN OUT L
JK7
PHONES
IC1
IC2
IC3
IC4
IC7
IC8
IC9
IC10
IC12
IC13
IC14
IC15
IC18
IC19
IC20
IC21
IC22
IC23
IC25
IC27
IC28
IC31
IC32
IC33
IC34
IC38
IC39
IC43
IC44
IC45
IC51
IC52
IC53
IC54
IC59
IC61
IC71
IC101
IC102
IC103
Q5
Q9
Q10
Q15
Q16
Q17
Q19
Q20
Q21
Q22
Q23
Q24
Q25
CN1
CN2
CN3
CN4
CN5
CN6
CN8
CN9
CN10
CN11
CN12
CN13
CN14
CN15
CN17
X1
X2
X3
X4
L1
L2
L3
L4
L5
L6
L7
L8
L9
L10
F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10

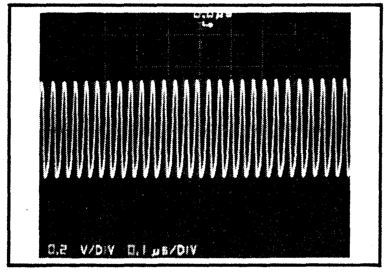

JK1
MIDI 1 IN
JK6
CONTROL PEDAL
JK4
FOOT SW 2
JK5
FOOT SW 1
JK11
SUB OUT 1R
JK10
SUB OUT 1L
JK9
MAIN OUT R
JK8
MAIN OUT L
JK7
PHONES
IC10
L1
L3
L4
L5
L6
L7
R15
R16
IC31
IC34
IC33
IC3
IC32
IC1
IC9
IC39
IC25
Q25
D29
D9
Q20
Q21
Q22
Q23
Q15
Q16
CN17
IC54
IC59
IC52
IC53
IC102
IC103
CN14
CN11
C203
C223
C224
C222
C225
IC61
IC51
X4
X3
Z55
Z54
Z52
Z53
CN12
IC4
CN13
IC43
IC44
IC45
Z37
Z38
Z39
Z40
Z41
Z42
Z43
Z44
Z45
Z46
Z47
Z16
Z15
R205
R206
R207
R171
R172
R104
R79
R105
R106
R107
CN10
CN9
CN8

Measuring Condition

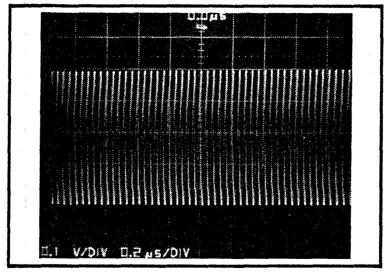
Set to the self-diagnostic mode followings.

- While pressing two E keys (E3, E4) simultaneously, turn on the power switch.
- SOUND/COMBINATION GROUP 6
- Keyboard C1

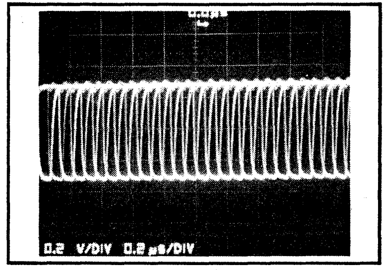
❷



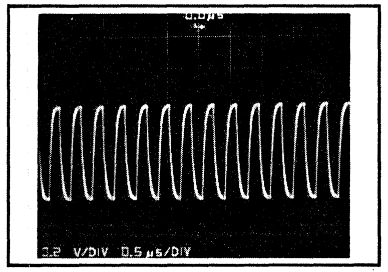
⓰



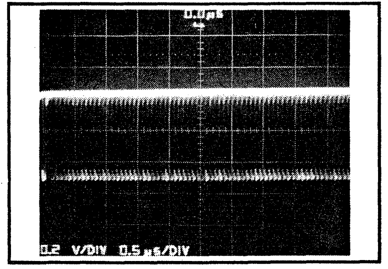
❸, ❹



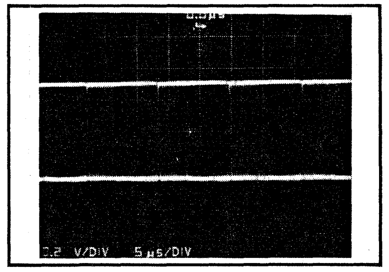
Ⓐ



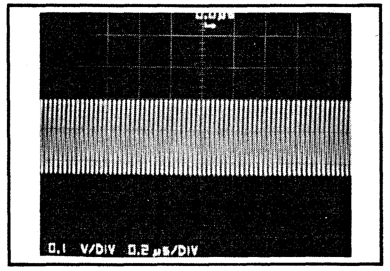
❼, ❽



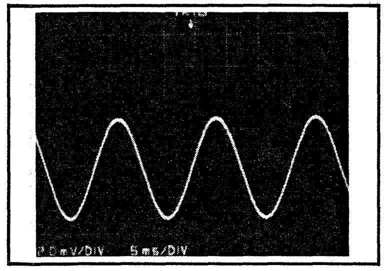
Ⓑ



⓯

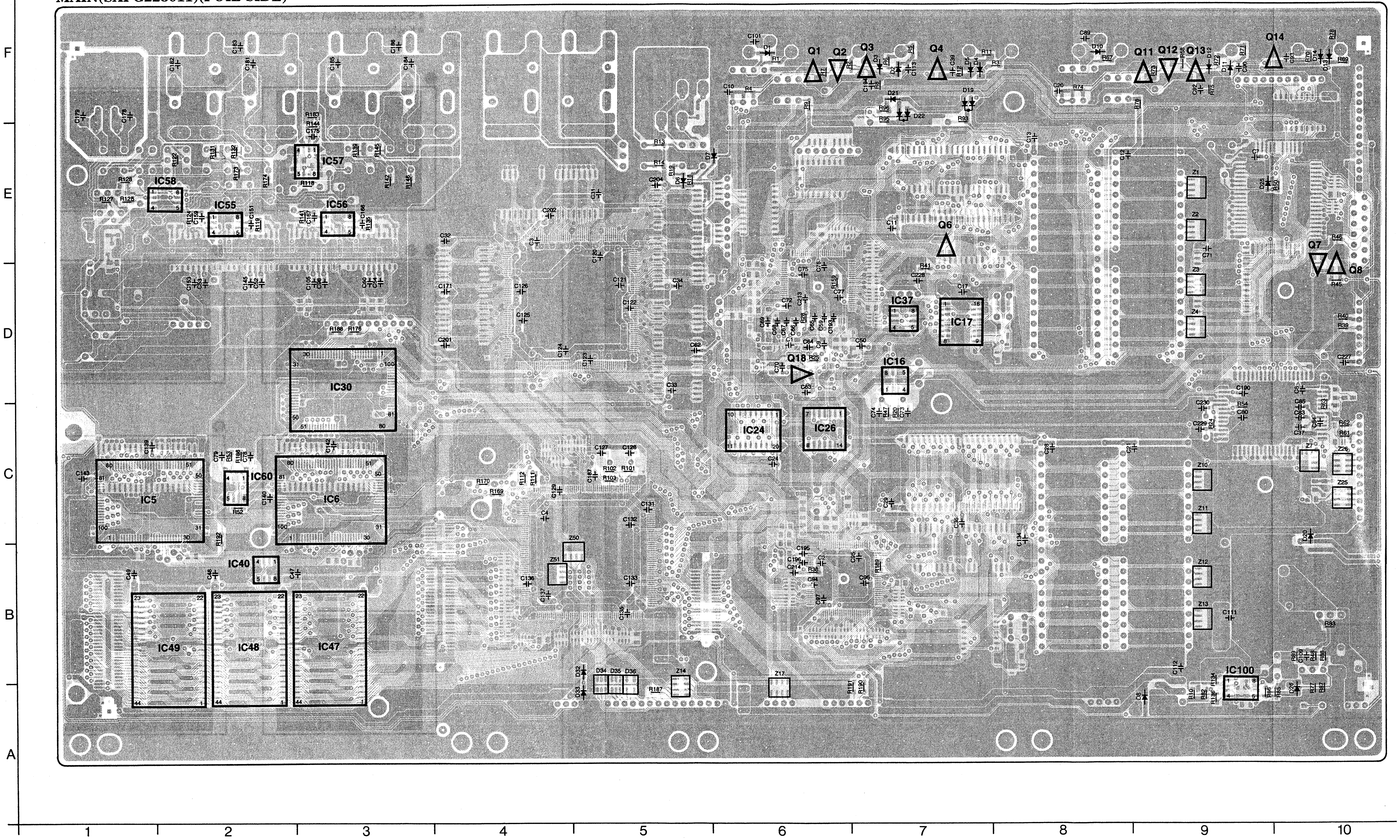


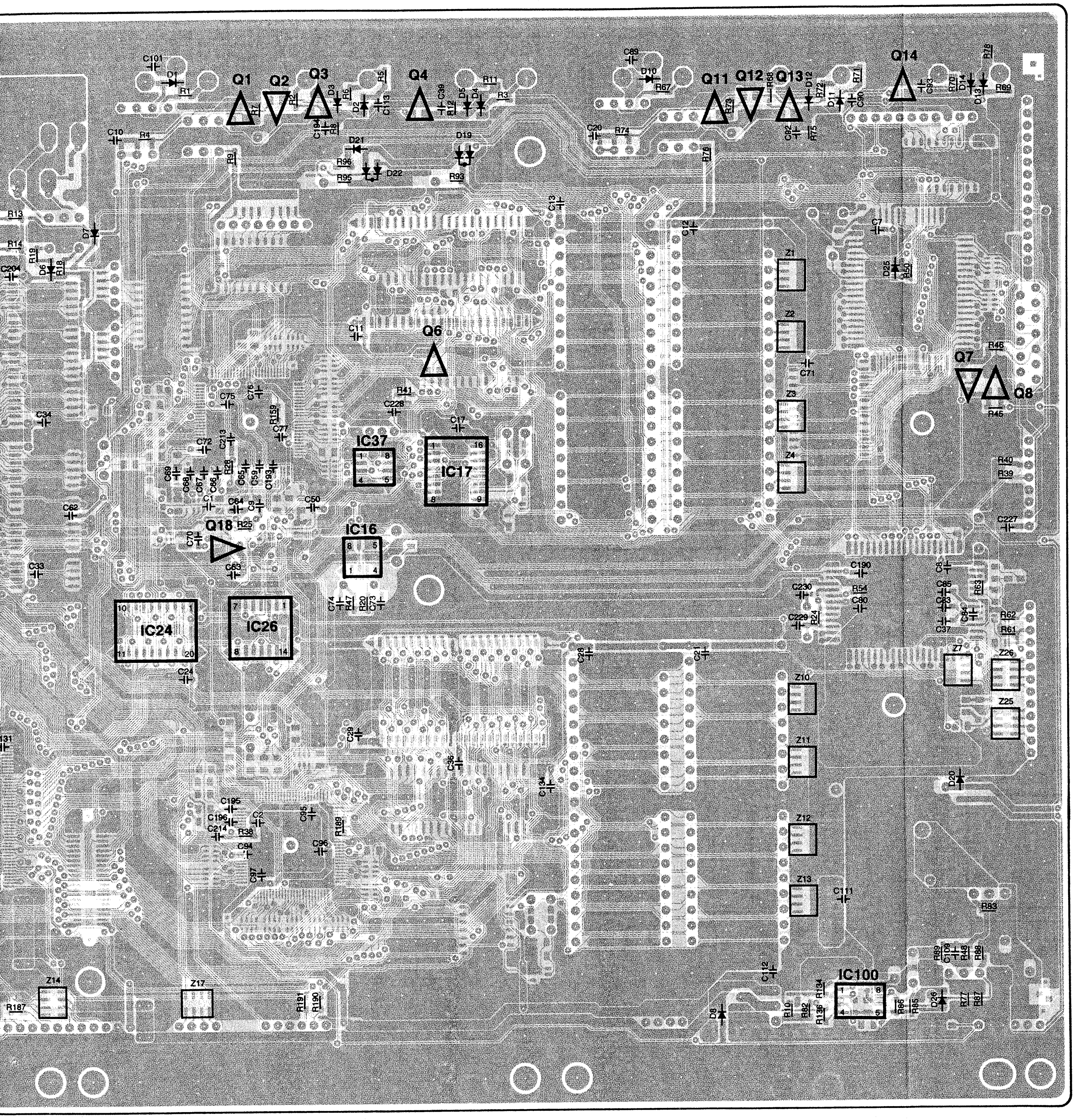
Ⓒ



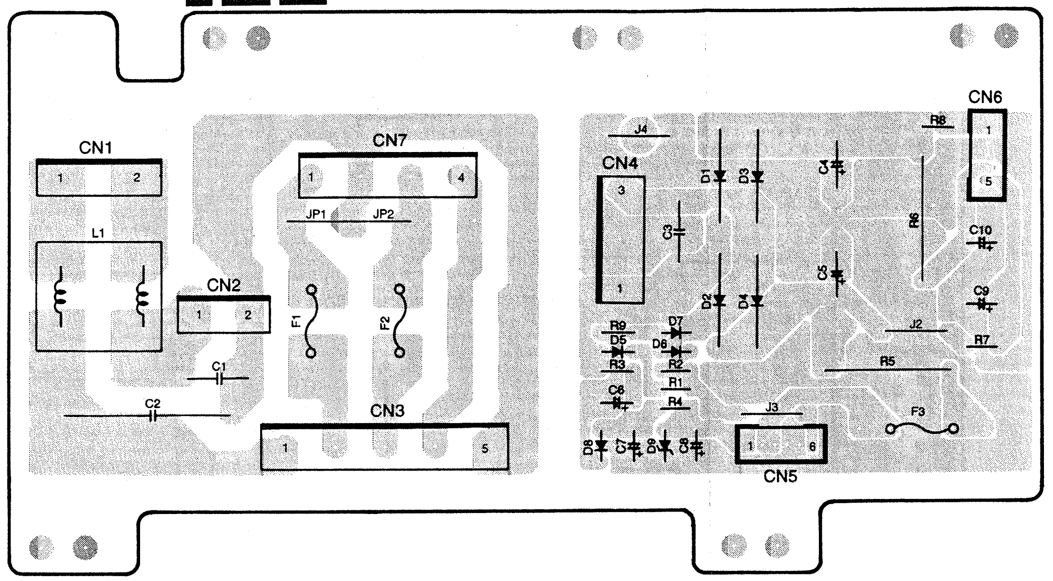
MAIN (FOIL SIDE)/MB1/MB2/ACP P.C. Board

MAIN(SXPG223011)(FOIL SIDE)


F
E
D
C
B
A
1
2
3
4
5
6
7
8
9
10
Q1
Q2
Q3
Q4
Q11
Q12
Q13
Q14
Q6
Q7
Q8
Q18
IC57
IC58
IC55
IC56
IC37
IC17
IC16
IC30
IC24
IC26
IC5
IC60
IC6
IC40
IC49
IC48
IC47
IC100
Z1
Z2
Z3
Z4
Z7
Z10
Z11
Z12
Z13
Z14
Z17
Z25
Z26
Z50
Z51


Q1
Q2
Q3
Q4
Q6
Q7
Q8
Q11
Q12
Q13
Q14
Q18
IC16
IC17
IC24
IC26
IC37
IC100
Z1
Z2
Z3
Z4
Z7
Z10
Z11
Z12
Z13
Z14
Z17
Z25
Z26

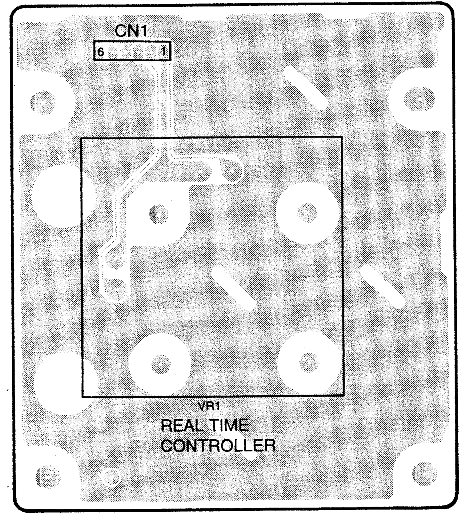
ACP X XR XS XD XT (SXPG223241A)
M MC XM (SXPG223231A) Others (SXPG223211A)


CN1
CN2
CN3
CN4
CN5
CN6
CN7
JP1
JP2
L1
F1
F2
F3

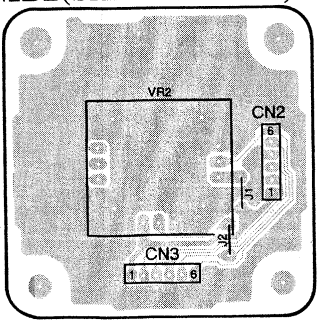
ACP P.C. Board

SXPG NO.	AREA	F1	F2	F3	CN7	JP1	JP2
223241A	X XR XS XD XT	XBA2C10TB0	XBA2C05TB0	XBA2C20TB0	○	×	×
223231A	M MC XM	XBA1C16NU100	×	XBA1C25NU100	×	○	×
223211A	Others	×	XBA2C05TB0	XBA2C20TB0	×	×	○

MB1(SXPG223211C)

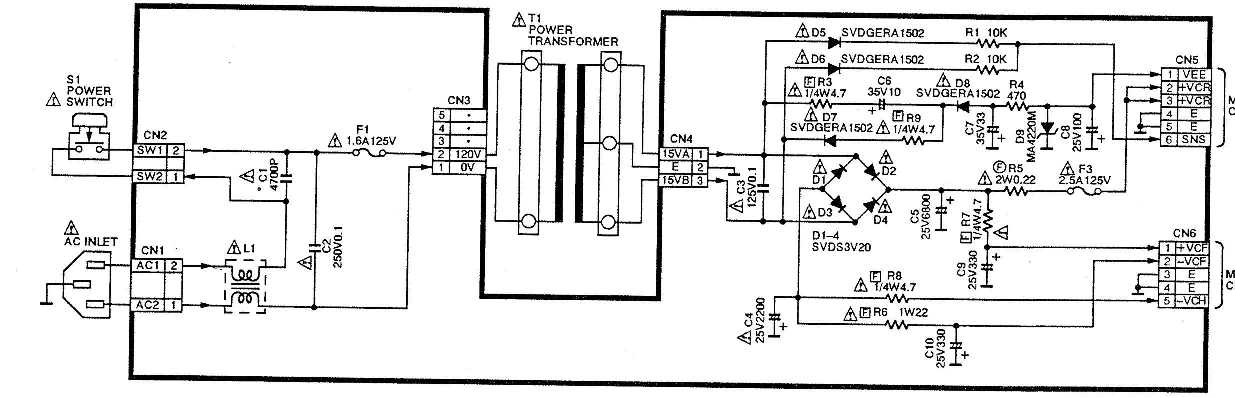

CN1
VR1
REAL TIME
CONTROLLER

MB2(SXPG223211D)

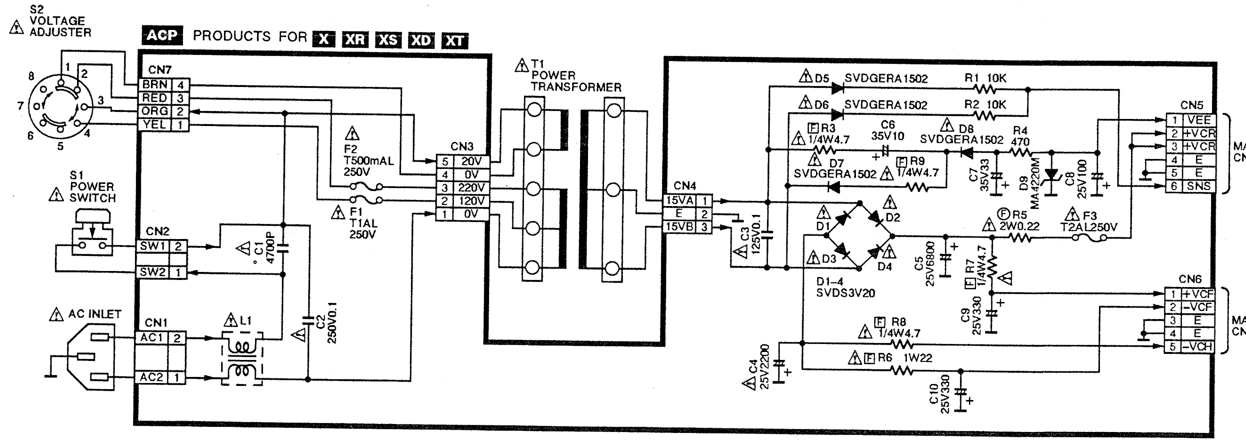

VR2
CN2
CN3
J1
J2

ACP P.C. Diagram

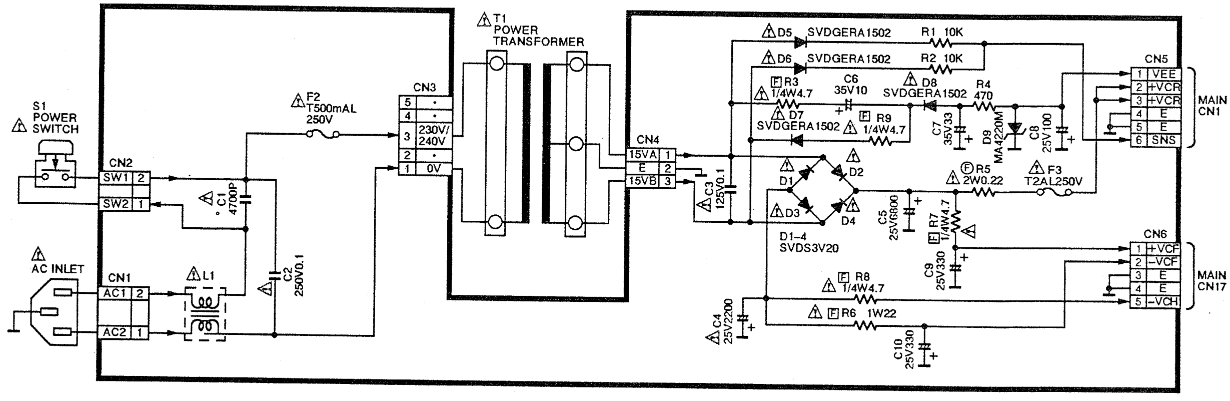
ACP PRODUCTS FOR **M** **MC** **XM**


S1 POWER SWITCH
CN2
SW1 2
SW2 1
AC INLET
CN1
AC1 2
AC2 1
C1 4700P
L1
C2 250V0.1
F1 1.6A125V
CN3
5 •
4 •
3 •
2 120V
1 0V
T1 POWER TRANSFORMER
CN4
15VA 1
E 2
15VB 3
C3 125V0.1
D1
D2
D3
D4
D1-4 SVDS3V20
D5 SVDGERA1502
D6 SVDGERA1502
R1 10K
R2 10K
R3 1/4W4.7
C6 35V10
D8 SVDGERA1502
R4 470
D7 SVDGERA1502
R9 1/4W4.7
C7 35V33
D9 MA4220M
C8 25V100
R5 2W0.22
F3 2.5A125V
C5 25V6800
R7 1/4W4.7
C9 25V330
R8 1/4W4.7
R6 1W22
C4 25V2200
C10 25V330
CN5
1 VEE
2 +VCR
3 +VCR
4 E
5 E
6 SNS
MAIN CN1
CN6
1 +VCF
2 -VCF
3 E
4 E
5 -VCH
MAIN CN17

ACP PRODUCTS FOR **X** **XR** **XS** **XD** **XT**

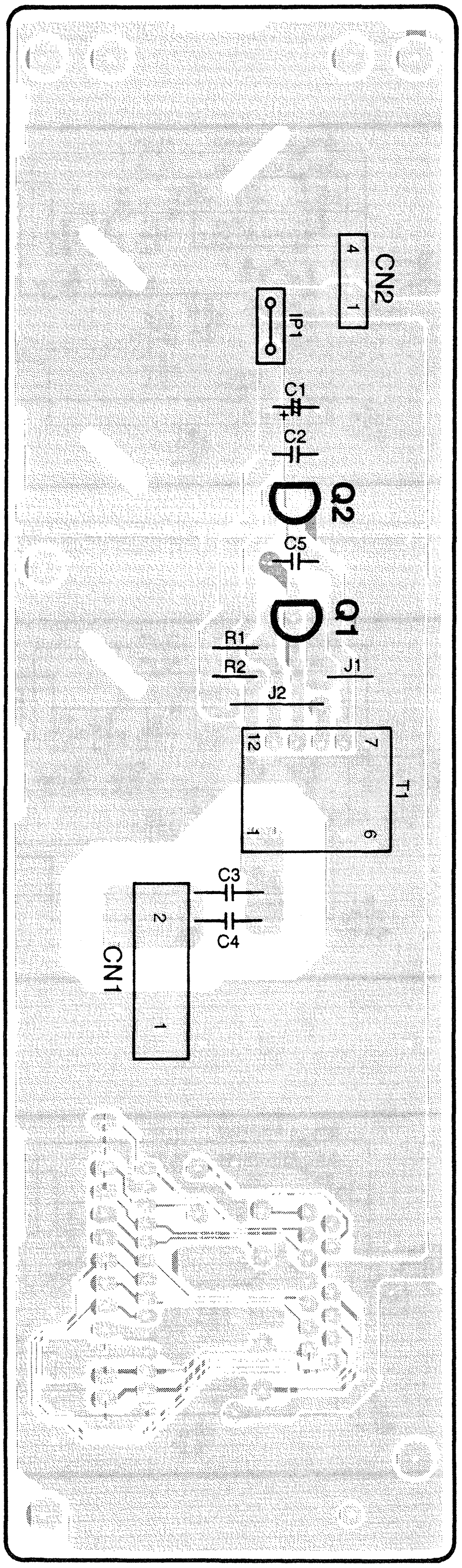

S2 VOLTAGE ADJUSTER
1
2
3
4
5
6
7
8
CN7
BRN 4
RED 3
ORG 2
YEL 1
S1 POWER SWITCH
CN2
SW1 2
SW2 1
AC INLET
CN1
AC1 2
AC2 1
C1 4700P
L1
C2 250V0.1
F2 T500mAL 250V
F1 T1AL 250V
CN3
5 20V
4 0V
3 220V
2 120V
1 0V
T1 POWER TRANSFORMER
CN4
15VA 1
E 2
15VB 3
C3 125V0.1
D1
D2
D3
D4
D1-4 SVDS3V20
D5 SVDGERA1502
D6 SVDGERA1502
R1 10K
R2 10K
R3 1/4W4.7
C6 35V10
D8 SVDGERA1502
R4 470
D7 SVDGERA1502
R9 1/4W4.7
C7 35V33
D9 MA4220M
C8 25V100
R5 2W0.22
F3 T2AL250V
C5 25V6800
R7 1/4W4.7
C9 25V330
R8 1/4W4.7
R6 1W22
C4 25V2200
C10 25V330
CN5
1 VEE
2 +VCR
3 +VCR
4 E
5 E
6 SNS
MAIN CN1
CN6
1 +VCF
2 -VCF
3 E
4 E
5 -VCH
MAIN CN17

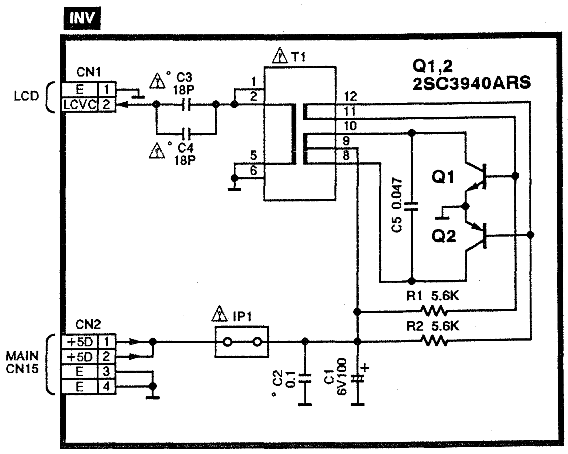
ACP PRODUCTS FOR Others


S1 POWER SWITCH
CN2
SW1 2
SW2 1
AC INLET
CN1
AC1 2
AC2 1
C1 4700P
L1
C2 250V0.1
F2 T500mAL 250V
CN3
5 •
4 •
3 230V/240V
2 •
1 0V
T1 POWER TRANSFORMER
CN4
15VA 1
E 2
15VB 3
C3 125V0.1
D1
D2
D3
D4
D1-4 SVDS3V20
D5 SVDGERA1502
D6 SVDGERA1502
R1 10K
R2 10K
R3 1/4W4.7
C6 35V10
D8 SVDGERA1502
R4 470
D7 SVDGERA1502
R9 1/4W4.7
C7 35V33
D9 MA4220M
C8 25V100
R5 2W0.22
F3 T2AL250V
C5 25V6800
R7 1/4W4.7
C9 25V330
R8 1/4W4.7
R6 1W22
C4 25V2200
C10 25V330
CN5
1 VEE
2 +VCR
3 +VCR
4 E
5 E
6 SNS
MAIN CN1
CN6
1 +VCF
2 -VCF
3 E
4 E
5 -VCH
MAIN CN17

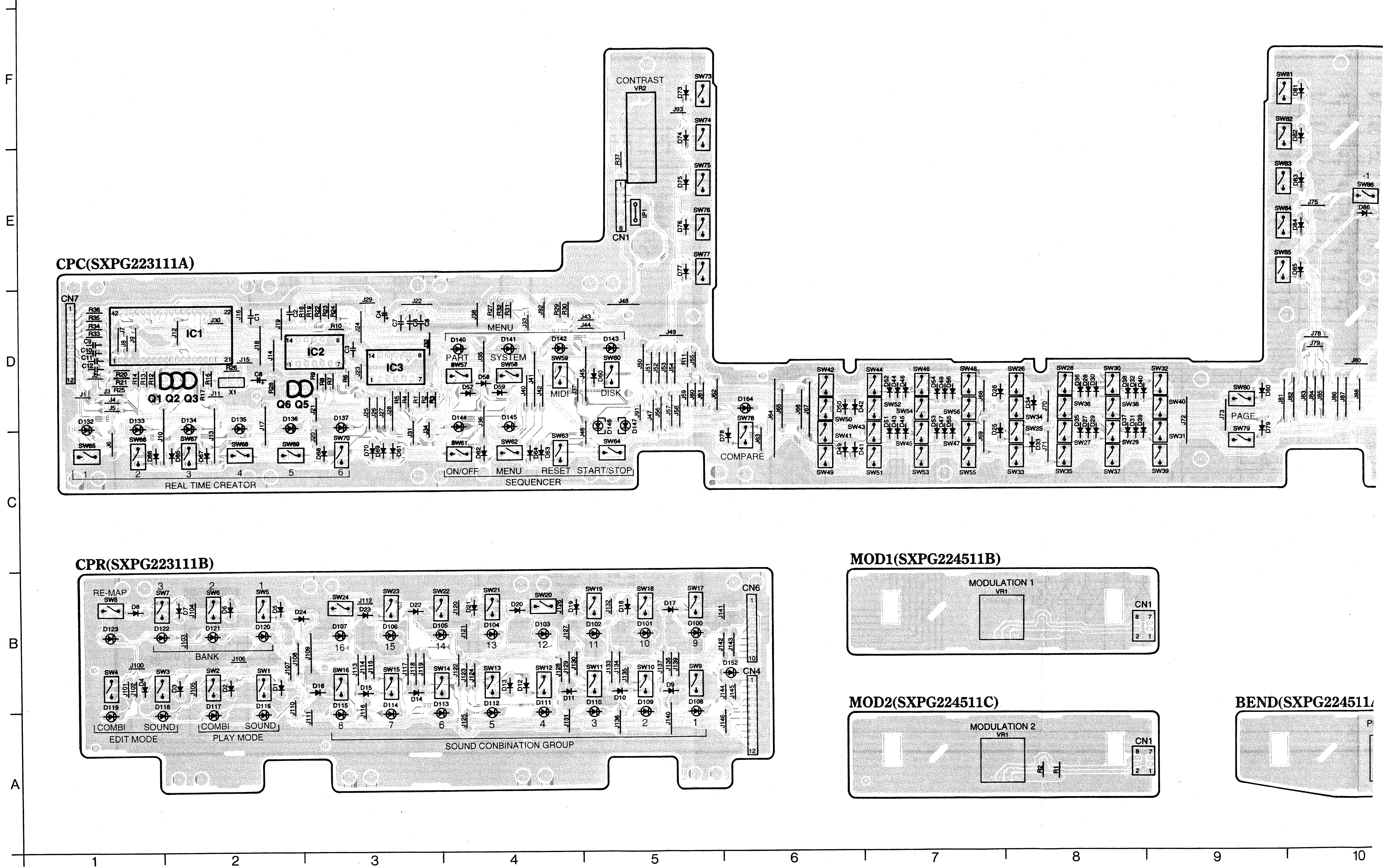
INV

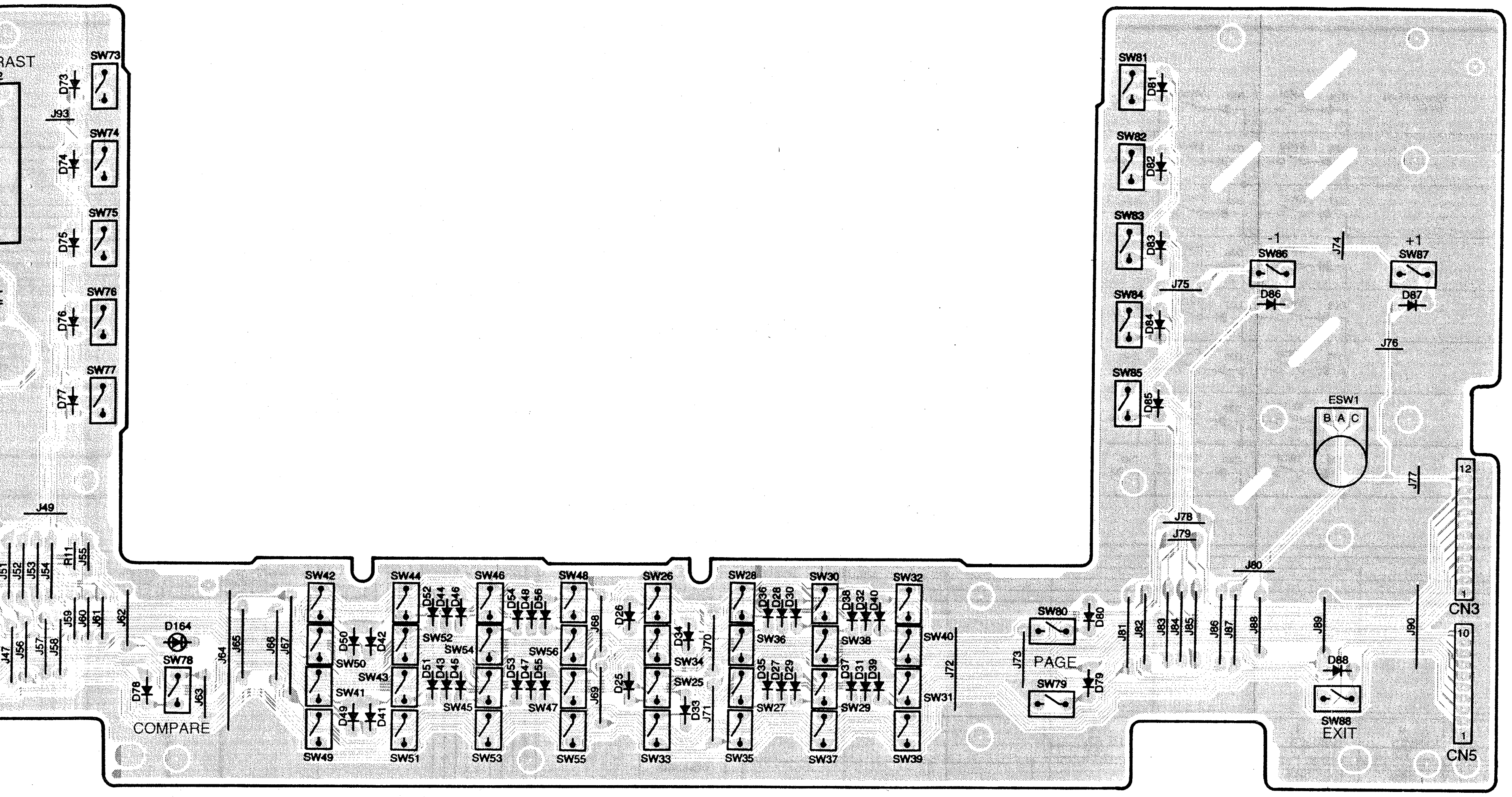
INV(SXPG223211B)


CN2
4
1
IP1
C1
C2
Q2
C5
Q1
R1
R2
J1
J2
12
7
T1
1
6
C3
C4
2
CN1
1
F
E
D
C
B
A
1
2
3
4
5

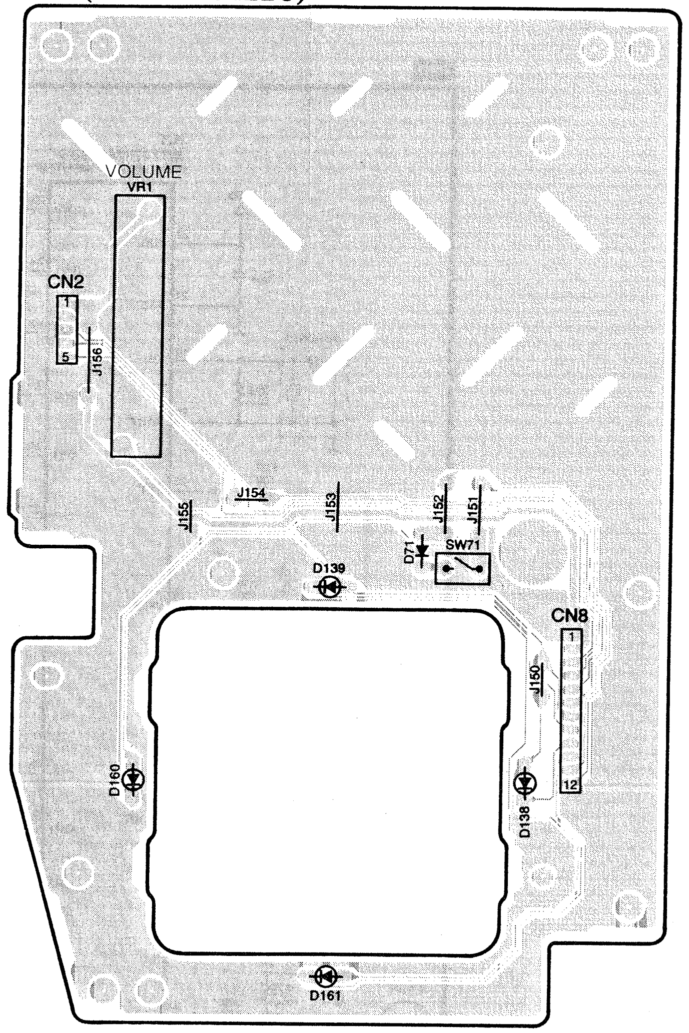

INV
CN1
LCD
E 1
LCVC 2
C3 18P
C4 18P
T1
1
2
5
6
12
11
10
9
8
Q1,2
2SC3940ARS
Q1
Q2
C5 0.047
R1 5.6K
R2 5.6K
CN2
MAIN CN15
+5D 1
+5D 2
E 3
E 4
IP1
C2 0.1
C1 6V100

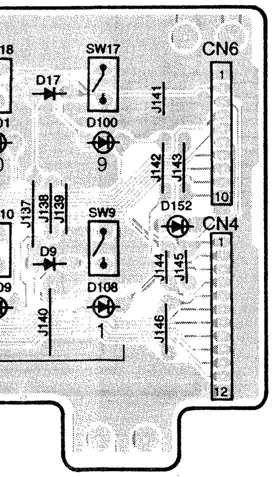
CPC/CPL/CPR/MOD1/MOD2/BEND/CNB P.C. Board


CPC(SXPG223111A)
CONTRAST
VR2
CN1
CN7
IC1
IC2
IC3
Q1 Q2 Q3
Q6 Q5
X1
MENU
PART
SYSTEM
MIDI
DISK
ON/OFF
MENU
RESET
START/STOP
SEQUENCER
1
2
3
4
5
6
REAL TIME CREATOR
COMPARE
PAGE
CPR(SXPG223111B)
RE-MAP
BANK
COMBI
SOUND
EDIT MODE
COMBI
SOUND
PLAY MODE
SOUND CONBINATION GROUP
CN6
CN4
MOD1(SXPG224511B)
MODULATION 1
VR1
CN1
MOD2(SXPG224511C)
MODULATION 2
VR1
CN1
BEND(SXPG224511
A
B
C
D
E
F
1
2
3
4
5
6
7
8
9
10

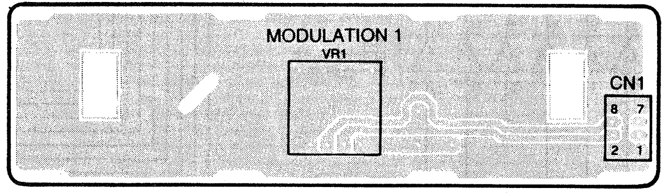

RAST
SW73
SW74
SW75
SW76
SW77
D73
D74
D75
D76
D77
J93
J49
SW42
SW44
SW46
SW48
SW26
SW28
SW30
SW32
SW41
SW43
SW45
SW47
SW49
SW50
SW51
SW52
SW53
SW54
SW55
SW56
SW33
SW34
SW35
SW36
SW37
SW38
SW39
SW40
SW25
SW27
SW29
SW31
SW78
D78
D164
COMPARE
SW79
SW80
D79
D80
PAGE
SW81
SW82
SW83
SW84
SW85
D81
D82
D83
D84
D85
-1
+1
SW86
SW87
D86
D87
J74
J75
J76
J77
J78
J79
J80
ESW1
B
A
C
SW88
D88
EXIT
CN3
CN5
12
1
10
1

CPL(SXPG223111C)

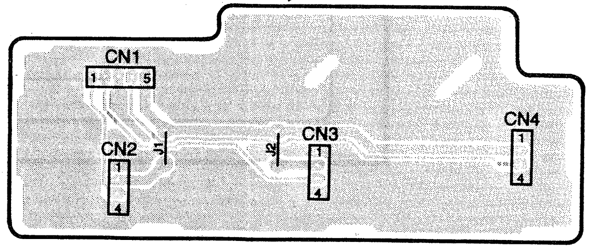

VOLUME
VR1
CN2
1
5
J156
J155
J154
J153
J152
J151
D71
SW71
D139
CN8
1
12
J150
D160
D138
D161


SW17
D17
CN6
J141
D100
9
J142
J143
10
SW9
D152
CN4
J137
J138
J139
D9
D108
J144
J145
1
J140
J146
12

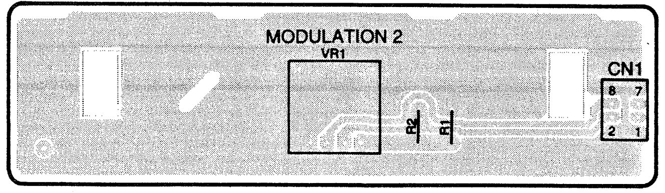
MOD1(SXPG224511B)


MODULATION 1
VR1
CN1
8
7
2
1

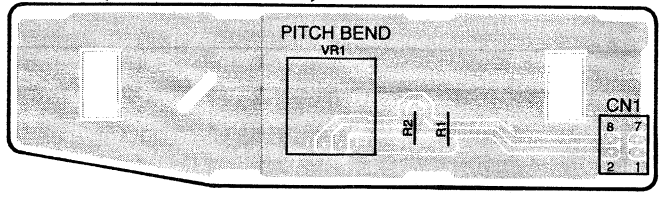
CNB(SXPG224511D)


CN1
1
5
CN2
1
4
J1
J2
CN3
1
4
CN4
1
4

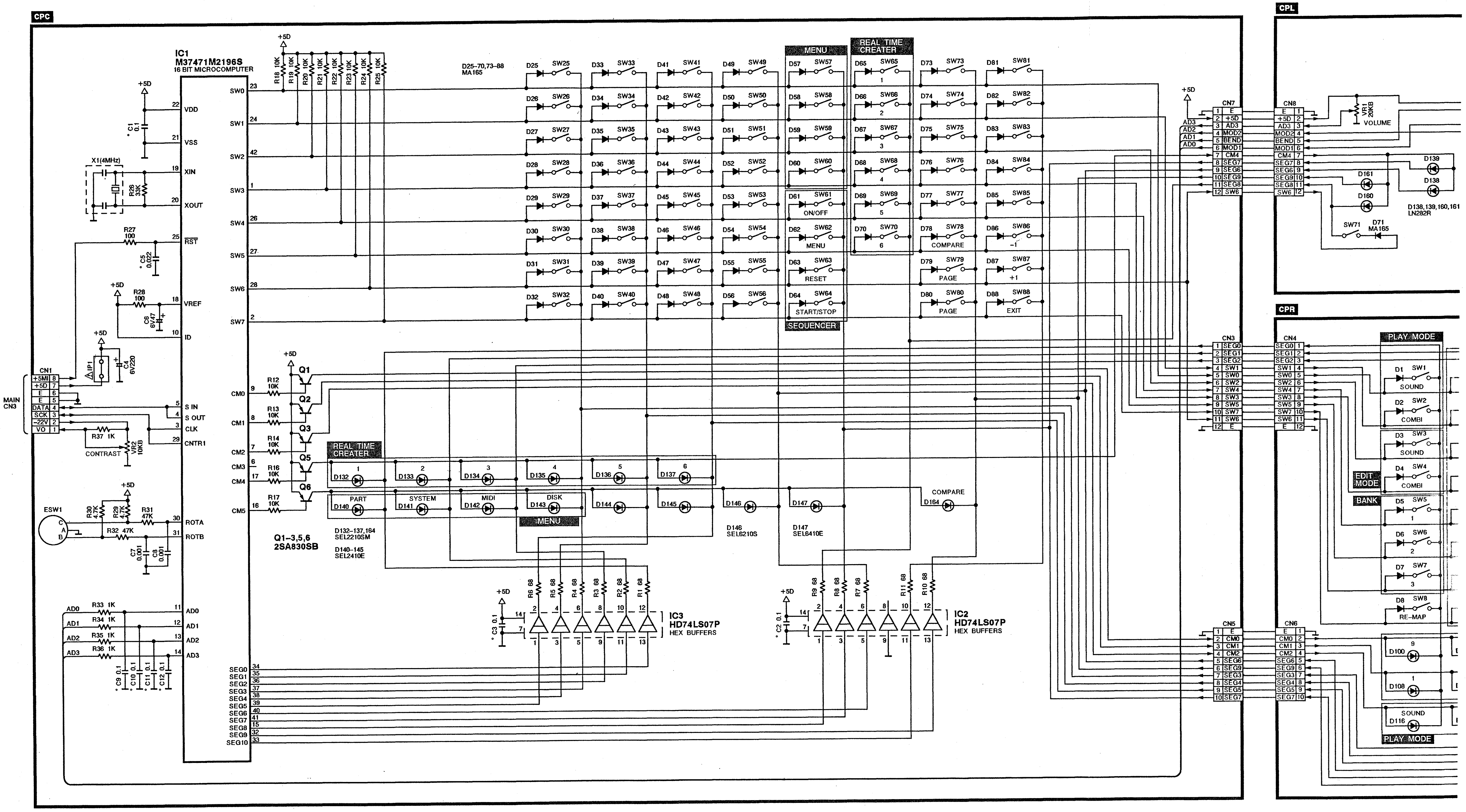
MOD2(SXPG224511C)

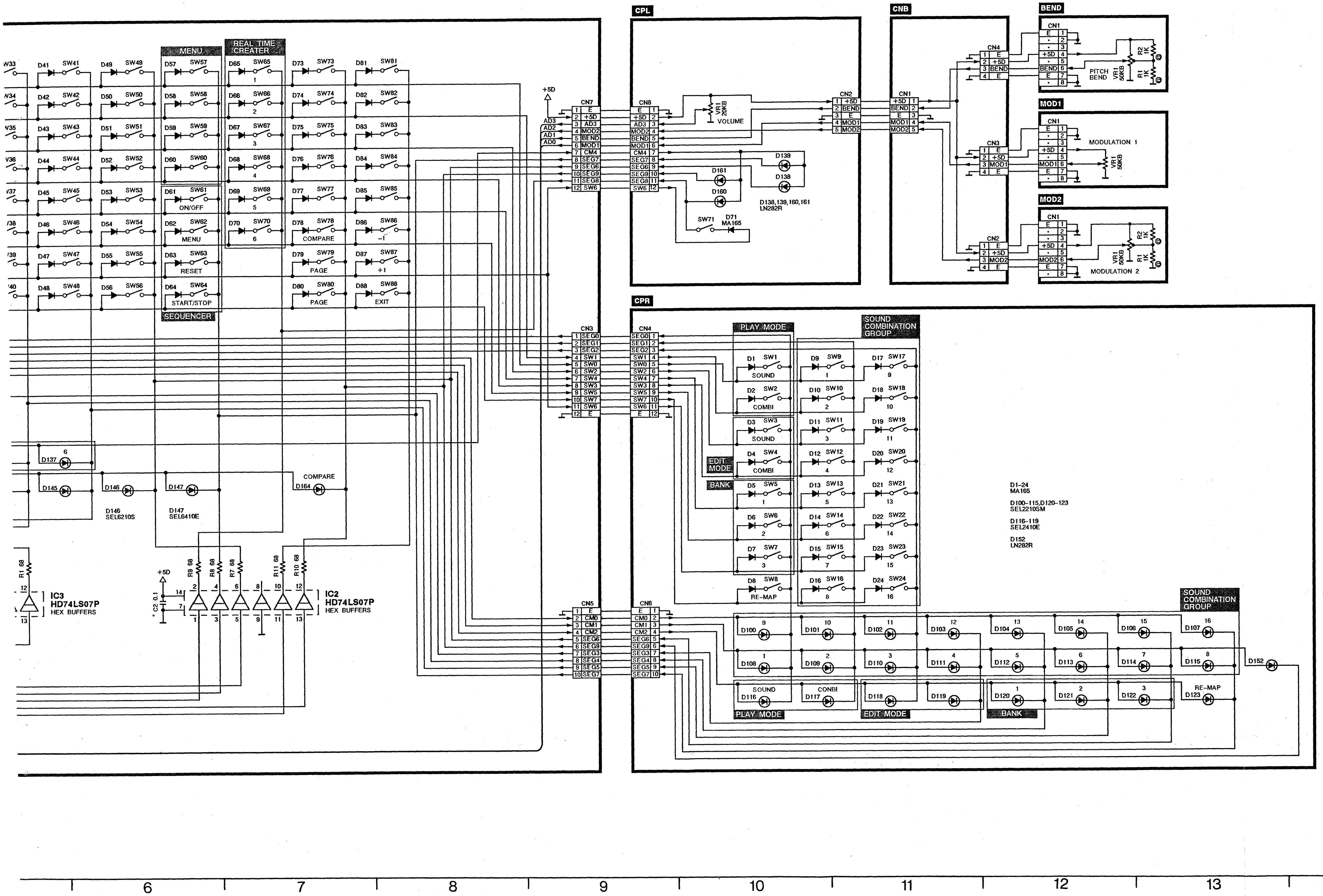

MODULATION 2
VR1
R2
R1
CN1
8
7
2
1

BEND(SXPG224511A)


PITCH BEND
VR1
R2
R1
CN1
8
7
2
1

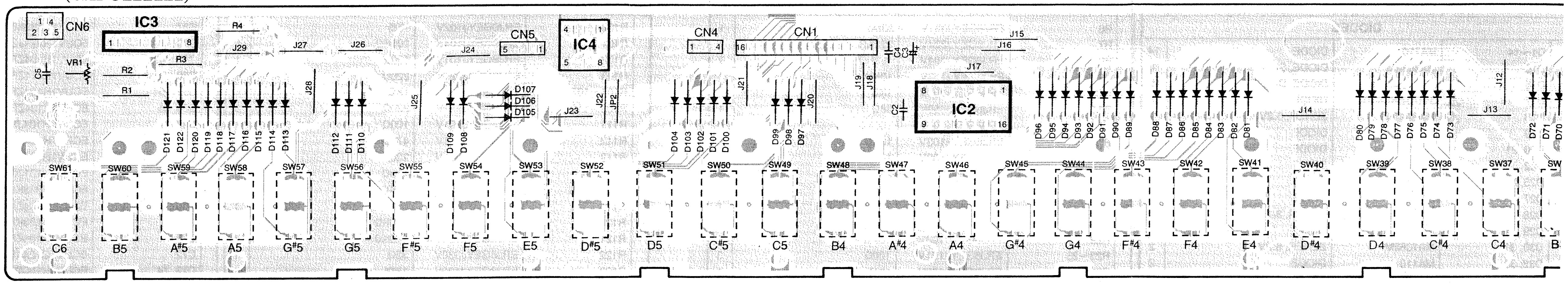
CPC/CPL/CPR/MOD1/MOD2/BEND/CNB P.C. Diagram


CPC
CPL
CPR
IC1
M37471M2196S
16 BIT MICROCOMPUTER
VDD
VSS
XIN
XOUT
RST
VREF
ID
S IN
S OUT
CLK
CNTR1
ROTA
ROTB
AD0
AD1
AD2
AD3
SW0
SW1
SW2
SW3
SW4
SW5
SW6
SW7
CM0
CM1
CM2
CM3
CM4
CM5
SEG0
SEG1
SEG2
SEG3
SEG4
SEG5
SEG6
SEG7
SEG8
SEG9
SEG10
+5D
C1 0.1
X1(4MHz)
R26 33K
R27 100
C5 0.022
R28 100
C6 6V47
IP1
C4 6V220
CN1
MAIN CN3
+5MI
+5D
E
DATA
SCK
−22V
VO
R37 1K
CONTRAST
VR2 10KB
ESW1
R30 4.7K
R29 4.7K
R31 47K
R32 47K
C7 0.001
C8 0.001
R33 1K
R34 1K
R35 1K
R36 1K
C9 0.1
C10 0.1
C11 0.1
C12 0.1
R18 10K
R19 10K
R20 10K
R21 10K
R22 10K
R23 10K
R24 10K
R25 10K
R12 10K
R13 10K
R14 10K
R16 10K
R17 10K
Q1
Q2
Q3
Q5
Q6
Q1–3,5,6
2SA830SB
D25–70,73–88
MA165
MENU
REAL TIME CREATER
SEQUENCER
ON/OFF
RESET
START/STOP
COMPARE
PAGE
EXIT
−1
+1
PART
SYSTEM
MIDI
DISK
D132–137,164
SEL2210SM
D140–145
SEL2410E
D146
SEL6210S
D147
SEL6410E
IC3
HD74LS07P
HEX BUFFERS
IC2
HD74LS07P
HEX BUFFERS
R6 68
R5 68
R4 68
R3 68
R2 68
R1 68
R9 68
R8 68
R7 68
R11 68
R10 68
C3 0.1
C2 0.1
CN7
CN8
CN3
CN4
CN5
CN6
E
+5D
AD3
MOD2
BEND
MOD1
CM4
SEG7
SEG6
SEG9
SEG8
SW6
VR1 20KB
VOLUME
D139
D138
D161
D160
SW71
D71
MA165
D138,139,160,161
LN282R
PLAY MODE
EDIT MODE
BANK
SOUND
COMBI
RE-MAP
D100
D108
D116
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SW8
D1
D2
D3
D4
D5
D6
D7
D8


MENU
REAL TIME CREATER
SEQUENCER
ON/OFF
MENU
RESET
START/STOP
COMPARE
PAGE
PAGE
-1
+1
EXIT
CPL
CNB
BEND
MOD1
MOD2
CPR
CN7
CN8
CN2
CN1
CN3
CN4
CN5
CN6
+5D
AD3
AD2
AD1
AD0
VR1 20KB
VOLUME
D138,139,160,161 LN282R
SW71
D71 MA165
PITCH BEND
VR1 50KB
R1 1K
R2 1K
MODULATION 1
MODULATION 2
D146 SEL6210S
D147 SEL6410E
IC3 HD74LS07P HEX BUFFERS
IC2 HD74LS07P HEX BUFFERS
R1 68
R9 68
R8 68
R7 68
R11 68
R10 68
C2 0.1
PLAY MODE
SOUND COMBINATION GROUP
EDIT MODE
BANK
SOUND
COMBI
RE-MAP
CONBI
D1-24 MA165
D100-115,D120-123 SEL2210SM
D116-119 SEL2410E
D152 LN282R
6
7
8
9
10
11
12
13
14

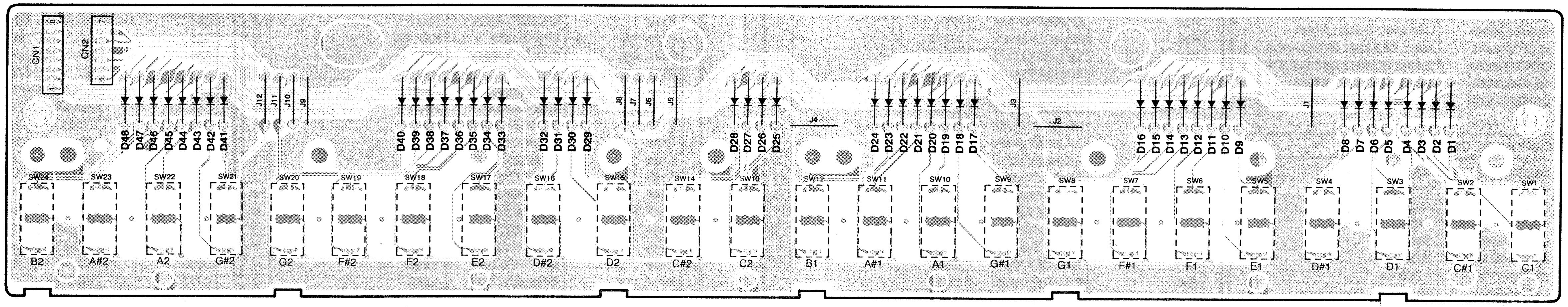
MKB1/MKB2

MKB2(SXPG222121)

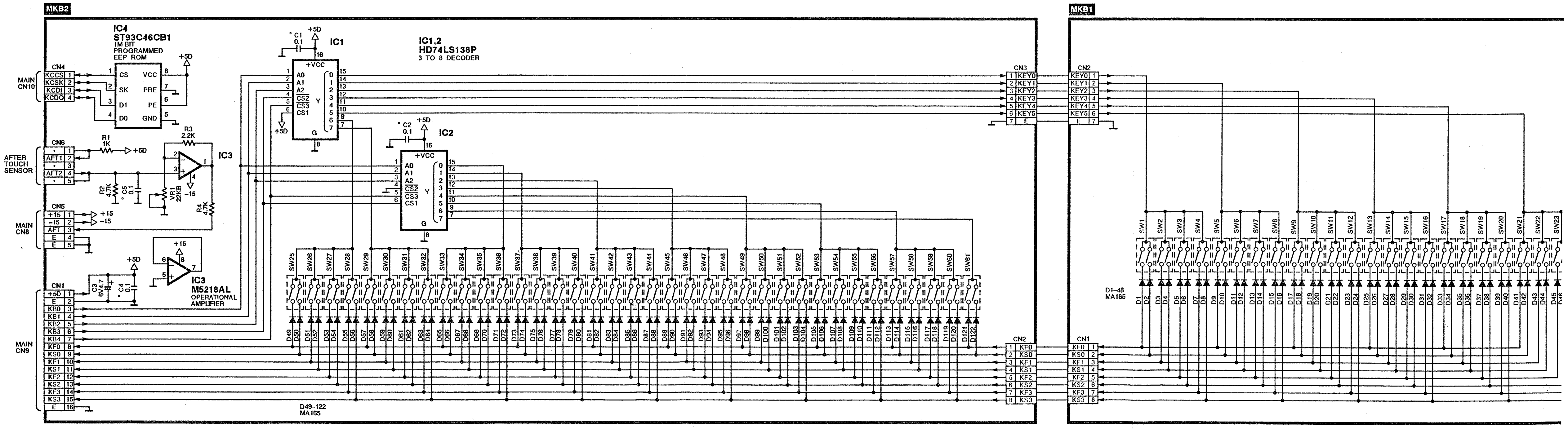


CN6
IC3
IC4
CN5
CN4
CN1
IC2
VR1
C6
B5
A#5
A5
G#5
G5
F#5
F5
E5
D#5
D5
C#5
C5
B4
A#4
A4
G#4
G4
F#4
F4
E4
D#4
D4
C#4
C4

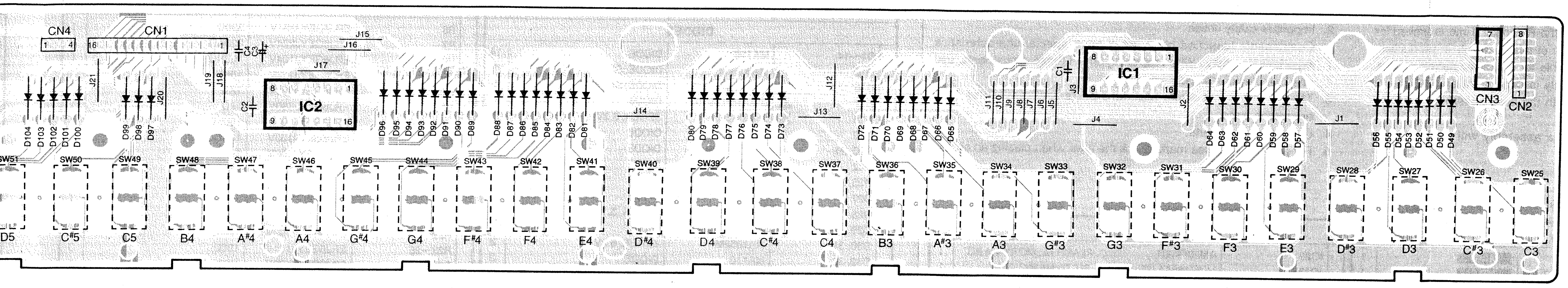
MKB1 (SXPG222011)

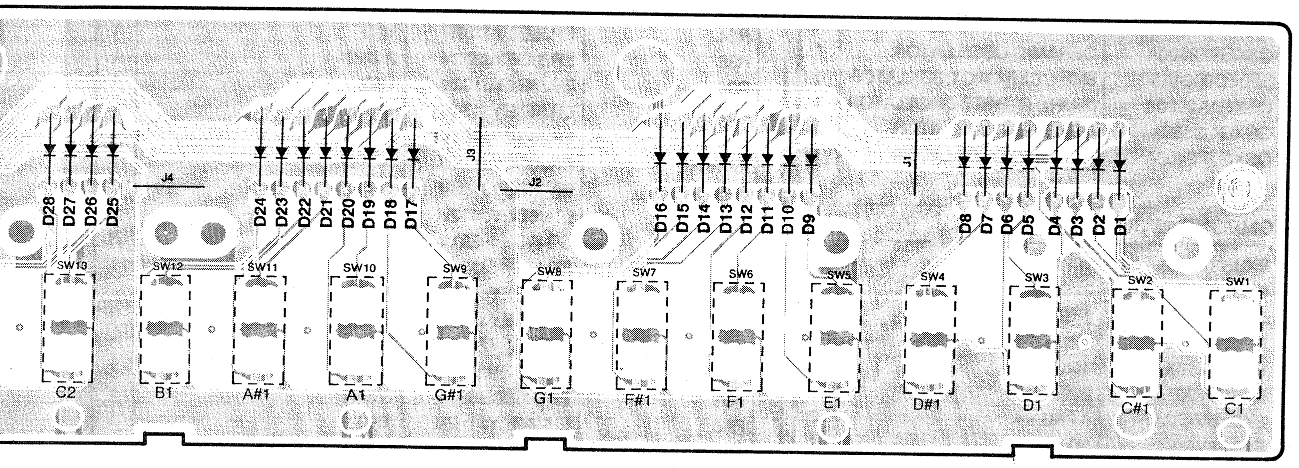


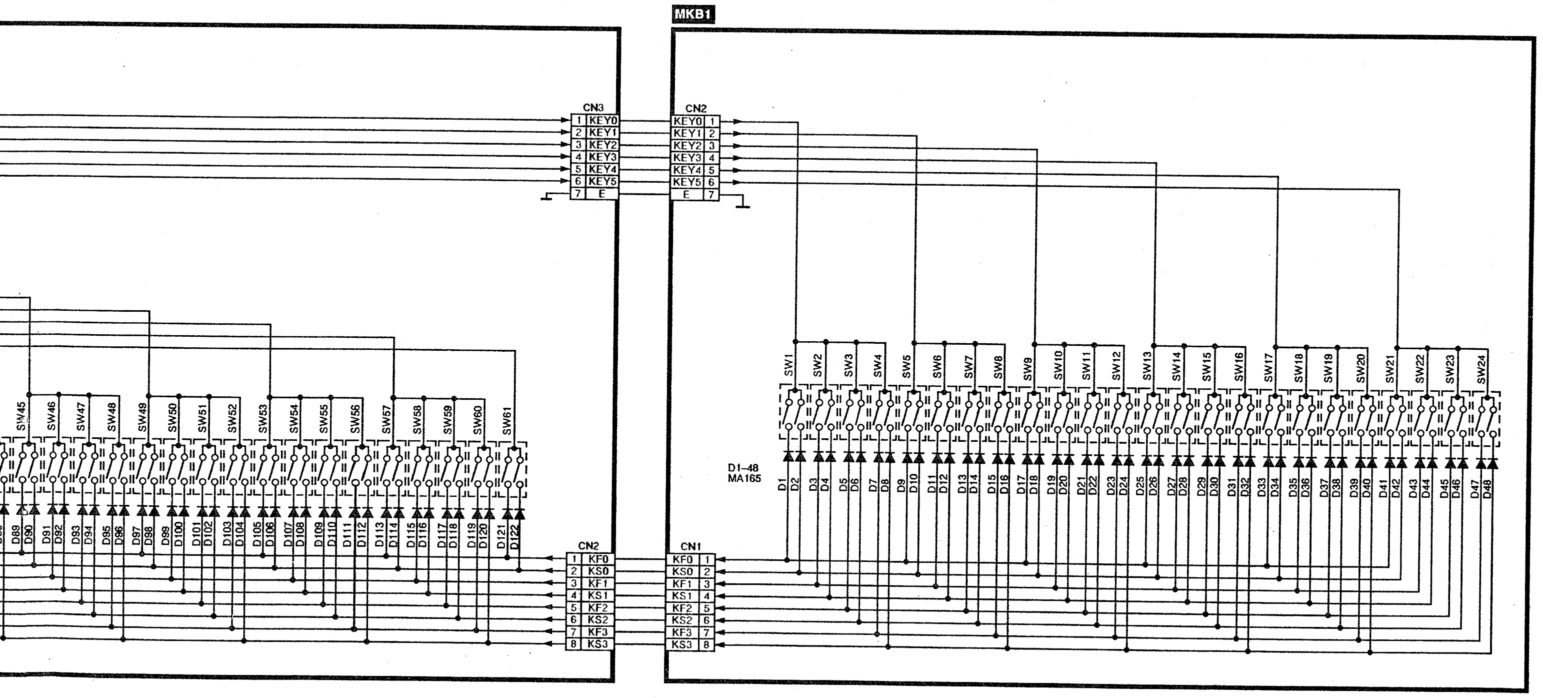
CN1
CN2
B2
A#2
A2
G#2
G2
F#2
F2
E2
D#2
D2
C#2
C2
B1
A#1
A1
G#1
G1
F#1
F1
E1
D#1
D1
C#1
C1



MKB2
MKB1
IC4
ST93C46CB1
1M BIT
PROGRAMMED
EEP ROM
IC1,2
HD74LS138P
3 TO 8 DECODER
IC3
M5218AL
OPERATIONAL
AMPLIFIER
MAIN CN10
AFTER TOUCH SENSOR
MAIN CN8
MAIN CN9
D49-122
MA165
D1-48
MA165


CN4
CN1
J15
J16
J17
J21
J20
J19
J18
C2
C3
C4
IC2
J14
J13
J12
J11
J10
J9
J8
J7
J6
J5
J3
J4
C1
IC1
J2
J1
CN3
CN2
SW51
SW50
SW49
SW48
SW47
SW46
SW45
SW44
SW43
SW42
SW41
SW40
SW39
SW38
SW37
SW36
SW35
SW34
SW33
SW32
SW31
SW30
SW29
SW28
SW27
SW26
SW25
D5
C#5
C5
B4
A#4
A4
G#4
G4
F#4
F4
E4
D#4
D4
C#4
C4
B3
A#3
A3
G#3
G3
F#3
F3
E3
D#3
D3
C#3
C3


J4
J3
J2
J1
D28
D27
D26
D25
D24
D23
D22
D21
D20
D19
D18
D17
D16
D15
D14
D13
D12
D11
D10
D9
D8
D7
D6
D5
D4
D3
D2
D1
SW13
SW12
SW11
SW10
SW9
SW8
SW7
SW6
SW5
SW4
SW3
SW2
SW1
C2
B1
A#1
A1
G#1
G1
F#1
F1
E1
D#1
D1
C#1
C1


MKB1
CN3
KEY0
KEY1
KEY2
KEY3
KEY4
KEY5
E
CN2
KF0
KS0
KF1
KS1
KF2
KS2
KF3
KS3
CN1
D1–48
MA165
SW1
SW2
SW3
SW4
SW5
SW6
SW7
SW8
SW9
SW10
SW11
SW12
SW13
SW14
SW15
SW16
SW17
SW18
SW19
SW20
SW21
SW22
SW23
SW24
SW45
SW46
SW47
SW48
SW50
SW51
SW52
SW53
SW54
SW55
SW56
SW57
SW58
SW59
SW60
SW61

REPLACEMENT PARTS LIST......P.C.B. and Wiring Parts

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retension period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention.
   After the end of this period, the assembly will no longer be available.
2. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
3. The "S" mark is service standard parts and may differ from production parts.
4. ○ mark are new parts.
5. For part No. with area mark, check the area when placing an order.

■ PRINTED CIRCUIT BOARD

	RTL	Area	Part No.	Description	P/S
○	RTL		SXPG223011	MAIN	1
○	RTL		SXPG223211C	MB1	1
○	RTL		SXPG223211D	MB2	1
○	RTL	EN EK EZ EW EF EA EH EP XL XP	SXPG223211A	ACP	1
○	RTL	M MC XM	SXPG223231A	ACP	1
○	RTL	X XR XS XD XT	SXPG223241A	ACP	1
○	RTL		SXPG223211B	INV	1
○	RTL		SXPG223111A	CPC	1
○	RTL		SXPG223111C	CPL	1
○	RTL		SXPG223111B	CPR	1
○	RTL		SXPG224511B	MOD1	1
○	RTL		SXPG224511C	MOD2	1
○	RTL		SXPG224511A	BEND	1
○	RTL		SXPG224511D	CNB	1
	RTL		SXPG222011	MKB1	1
○	RTL		SXPG222121	MKB2	1
○			QSLG017AA	LCD	1

MAIN MAIN CIRCUIT

INTEGRATED CIRCUITS

	Ref. No.	Part No.	Description	P/S
	IC1, 2	TMP95C061AF	IC, MICROCONTROLER, 16BIT	2
○	IC3	L7A1429	TONE GENERATOR	1
	IC4	TC183C230002	IC, MICROCONTROLER, 8BIT	1
	IC5, 6	D6383GF-3BA	IC, MICROCONTROLER, 16BIT	2
	IC7	SED1330FBA	LCD CONTROLLER	1
	IC8	D72070GF3BE	IC, MICROCONTROLER, 8BIT	1
	IC9	TC7S14F	OR GATE	1
	IC10	QCPL-260L	PHOTO COUPLER	1
○	IC12	QSIGCWSA1AX	IC, 4M EP ROM	1
	IC12-1	〔M27C400210F1	(BLANK ROM)	1
○	IC13	QSIGCWSA1BX	IC, 4M EP ROM	1
	IC13-1	〔M27C400210F1	(BLANK ROM)	1
	IC14	M5256CFP70LL	IC, S RAM	1
○	IC15	M5M44170AJ7S	IC, D RAM 4M BIT	1
	IC16	T7WU04F	IC, CMOS LOGIC	1
	IC17	D74HC139GS	IC, CMOS LOGIC	1
	IC18	D74HC138GS	IC, CMOS LOGIC	1
○	IC19	TC7S08F	IC, CMOS LOGIC	1
	IC20	QCPL-260L	PHOTO COUPLER	1
○	IC21	QSIGCWSA1DX	IC, 4M EP ROM	1
	IC21-1	〔M27C400210F1	(BLANK ROM)	1
○	IC22	AM29F400T	IC, FLASH MEMORY 4M BIT	1
	IC23	LC321664AJ80	1M BIT DYNAMIC RAM	1
	IC24, 25	D74HC374GS	IC, CMOS LOGIC	2
	IC26	D74HC32GS	QUAD 2 INPUT OR GATE	1
	IC27	D74HC139GS	IC, CMOS LOGIC	1
○	IC28	QSIGCWSA1CX	IC, 4M EP ROM	1
	IC28-1	〔M27C400210F1	(BLANK ROM)	1
	IC30	D6383GF-3BA	IC, MICROCONTROLER, 16BIT	1
	IC31, 32	LC321664AJ80	1M BIT DYNAMIC RAM	2
○	IC33, 34	M5M44260AJ7S	IC, D RAM 4M BIT	2
	IC37	TC7W08F	DUAL 2-INPUT AND GATES	1
○	IC38	TC7S08F	IC, CMOS LOGIC	1
	IC39	TC7S14F	OR GATE	1
	IC40	T7WU04F	IC, CMOS LOGIC	1
○	IC43	QSIGH3C16DT8	IC, MASK ROM 16M BIT	1
○	IC44	QSIGH3C16EA0	IC, MASK ROM 16M BIT	1
○	IC45	QSIGH3C16EA2	IC, MASK ROM 16M BIT	1
○	IC47	QSIGH3C16DT7	IC, MASK ROM 16M BIT	1
○	IC48	QSIGH3C16DT9	IC, MASK ROM 16M BIT	1
○	IC49	QSIGH3C16EA1	IC, MASK ROM 16M BIT	1
	IC51	LC321664AJ80	1M BIT DYNAMIC RAM	1
	IC52~54	PCM1702U	D-A CONVERTER	3
	IC55~58	M5218AFP	OPERATIONAL AMPLIFIER	4
	IC59	PCM1702U	D-A CONVERTER	1
	IC60	T7WU04F	IC, CMOS LOGIC	1
	IC61	LC321664AJ80	1M BIT DYNAMIC RAM	1
	IC71	LH5P832N-10	256K BIT PSEUDO STATIC RAM	1
	IC100	BA10393F	COMPARATOR	1
	IC101	M5223FP	IC, LINER	1
	IC102 ⚠	M5F7805L	VOLTAGE REGULATOR	1
	IC103 ⚠	M5F7905L	—5V VOLTAGE REGULATOR	1

TRANSISTORS

	Ref. No.	Part No.	Description	P/S
	Q1	2SD601AQ	TRANSISTOR	1
	Q2~5	2SB709AR	TRANSISTOR	4
	Q6	2SD601AQ	TRANSISTOR	1
	Q7	2SB709AR	TRANSISTOR	1
	Q8, 9	2SD601AQ	TRANSISTOR	2
	Q10	2SB709AR	TRANSISTOR	1
	Q11	2SD601AQ	TRANSISTOR	1
	Q12~15	2SB709AR	TRANSISTOR	4
	Q16	2SD601AQ	TRANSISTOR	1
	Q17 ⚠	2SA1643	TRANSISTOR	1
	Q18	2SD601AQ	TRANSISTOR	1
	Q19	2SB941P	TRANSISTOR	1
	Q20	2SD592ARS	TRANSISTOR	1
	Q21	2SB621ARS	TRANSISTOR	1
	Q22	2SD592ARS	TRANSISTOR	1
	Q23	2SB621ARS	TRANSISTOR	1
S	Q24	2SC1815GR	TRANSISTOR	1
	Q25	2SB709AR	TRANSISTOR	1

DIODES

	Ref. No.	Part No.	Description	P/S
	D1~14	MA110	DIODE	14
○	D15	MA8082M	DIODE, SI	1
○	D16	MA8056L	DIODE, SI	1
	D17 ⚠	SVDGERC9102	DIODE	1
	D18 ⚠	MA2062LF	ZENER, 6.2V	1
	D19	MA151WK	DIODE	1
	D20, 21	MA110	DIODE	2
	D22	MA151WK	DIODE	1
	D25, 26	MA110	DIODE	2
	D27	EK04	DIODE	1
	D28	MA8030L	ZENER, 3.1V	1
	D29	MA110	DIODE	1
	D30, 31	MA1062M	ZENER, 6.2V	2
	D32, 33	MA110	DIODE	2
	D34, 35	MA121	DIODE, SI, 100mA	2
	D36	MA159A	DIODE, SI, 100mA	1

OSCILLATORS

	Ref. No.	Part No.	Description	P/S
○	X1	QSXG2F2800A	CERAMIC OSCILLATOR	1
	X2	EF0EC8004A5	8MHz, CERAMIC OSCILLATOR	1
	X3	QSXG1A2500A	25MHz, QUARTZ OSCILLATOR	1
	X4	QSXG1I3386A	CRYSTAL OSCILLATOR	1
	X5	QSXG2F2400A	CERAMIC OSCILLATOR	1

COMPONENT COMBINATIONS

	Ref. No.	Part No.	Description	P/S
	Z1~4	EXBS8V103J	10KΩ×4	4
	Z5	EXBV8V221J	220Ω×4	1
	Z6	EXBV8V102J	1KΩ×4	1
	Z7	EXBS8V102J	1KΩ×4	1
	Z10~13	EXBS8V103J	10KΩ×4	4
	Z14	EXBS8V221J	220Ω×4	1
	Z15, 16	EXBV8V472J	4.7KΩ×4	2
	Z17	EXBS8VR000	0Ω×4	1
	Z18~24	EXBV8V470J	47Ω×4	7
	Z25, 26	EXBS8V470J	47Ω×4	2
	Z27~29	EXBV8V102J	1KΩ×4	3
	Z30~36	EXBV8V470J	47Ω×4	7
	Z37~47	EXBV8V471J	470Ω×4	11
	Z48	EXBV8V102J	1KΩ×4	1
	Z49	EXBV8V471J	470Ω×4	1
	Z50, 51	EXBS8V103J	10KΩ×4	2
	Z52~55	EXBV8V221J	220Ω×4	4

COILS

	Ref. No.	Part No.	Description	P/S
	L1~7	QLQGT3T150SA	15μH×3	7
	L8	SLCG3A121T	120μH	1
	L9	QLBG002A	0.45μH	1
	L10	QLQGT1B800MA	80μH	1

JACKS

	Ref. No.	Part No.	Description	P/S
	JK1~3	QJJG005AA	JACK SOCKET	3
	JK4, 5	QJJG003AA	JACK	2
	JK6, 7	SJJG100A	JACK	2
	JK8~11	QJJG003AA	JACK	4

RESISTORS

	Ref. No.	Part No.	Description	P/S
	R1	ERJ6GEYJ221V	220Ω	1
	R2	ERJ6GEYJ330V	33Ω	1
	R3	ERJ6GEYJ680V	68Ω	1
	R4	ERJ6GEYJ102V	1KΩ	1
	R5	ERJ6GEYJ151V	150Ω	1
	R6	ERJ6GEYJ331V	330Ω	1
	R7	ERJ6GEYJ224V	220KΩ	1
	R8	ERJ6GEYJ104V	100KΩ	1
	R9	ERJ6GEYJ103V	10KΩ	1
	R10	ERJ6GEYJ102V	1KΩ	1
	R11	ERJ6GEYJ680V	68Ω	1
	R12	ERJ6GEYJ104V	100KΩ	1
	R13, 14	ERJ6GEYJ103V	10KΩ	2
	R15, 16	ERJ6GEYJ102V	1KΩ	2
	R18	ERJ6GEYJ221V	220Ω	1
	R19	ERJ6GEYJ102V	1KΩ	1
	R20	ERJ6GEYJ104V	100KΩ	1
	R21	ERJ6GEYJ221V	220Ω	1
	R22	ERJ6GEYJ103V	10KΩ	1
	R23~25	ERJ6GEYJ101V	100Ω	3
	R26	ERJ6GEYJ102V	1KΩ	1
	R28, 29	ERJ6GEYJ221V	220Ω	2
	R30	ERJ6GEYJ102V	1KΩ	1
	R31	ERJ6GEYJ221V	220Ω	1
	R33	ERJ6GEYJ104V	100Ω	1
	R34	ERJ6GEYJ102V	1KΩ	1
	R35	ERJ6GEYJ222V	2.2KΩ	1
	R36	ERJ6GEYJ102V	1KΩ	1
	R37	ERJ6GEYJ474V	470KΩ	1
	R38	ERJ6GEYJ221V	220Ω	1
	R39~42	ERJ6GEYJ472V	4.7KΩ	4
	R43, 44	ERJ6GEYJ103V	10KΩ	2
	R45, 46	ERJ6GEYJ472V	4.7KΩ	2
	R47~49	ERJ6GEYJ221V	220Ω	3
	R50	ERJ6GEYJ333V	33KΩ	1
	R51	ERJ6GEYJ473V	47KΩ	1
	R52	ERJ6GEYJ221V	220Ω	1
	R53	ERJ6GEYJ104V	100KΩ	1
	R54	ERJ6GEYJ103V	10KΩ	1
	R55	ERJ6GEYJ682V	6.8KΩ	1
	R56	ERJ6GEYJ102V	1KΩ	1
	R57~61	ERJ6GEYJ103V	10KΩ	5
	R62	ERJ6GEYJ102V	1KΩ	1
	R63	ERJ6GEYJ151V	150Ω	1
	R64, 65	ERJ6GEY0R00V	0Ω	2
	R67	ERJ6GEYJ221V	220Ω	1
	R68	ERJ6GEYJ330V	33Ω	1
	R69, 70	ERJ6GEYJ680V	68Ω	2
	R71	ERJ6GEYJ151V	150Ω	1
	R72	ERJ6GEYJ331V	330Ω	1
	R73	ERJ6GEYJ224V	220KΩ	1
	R74	ERJ6GEYJ102V	1KΩ	1
	R75	ERJ6GEYJ104V	100KΩ	1
	R76	ERJ6GEYJ103V	10KΩ	1
	R77	ERJ6GEYJ221V	220Ω	1
	R78	ERJ6GEYJ104V	100KΩ	1
	R79	ERJ6GEYJ472V	4.7KΩ	1
	R81	ERG1SJ331	330Ω, 1W, Flame Type	1
	R82	ERJ6GEYJ331V	330Ω	1
	R83	ERJ6GEYJ101V	100Ω	1
	R84	ERJ6GEYJ221V	220Ω	1
	R85	ERJ6GEYJ471V	470Ω	1
	R86	ERJ6GEYJ683V	68KΩ	1
	R87	ERJ6GEYJ221V	220Ω	1
	R88	ERJ6GEYJ472V	4.7KΩ	1
	R89	ERJ6GEYJ221V	220Ω	1
	R90, 91	ERJ6GEYJ122V	THICK FILM CHIP RESISTOR, 1/10W	2
○	R92	ERJ6GEYF102V	THICK FILM CHIP RESISTOR, 1/10W	1
	R93	ERJ6GEYJ101V	100Ω	1
	R94	ERJ6GEYJ152V	1.5KΩ	1
	R95~97	ERJ6GEYJ101V	100Ω	3
	R98	ERJ6GEYJ472V	4.7KΩ	1
	R99	ERJ6GEYJ221V	220Ω	1

Ref. No.	Part No.	Description	P/S
DIODES			
D1～14	MA110	DIODE	14
○ D15	MA8082M	DIODE, SI	1
○ D16	MA8056L	DIODE, SI	1
D17 ⚠	SVDGERC9102	DIODE	1
D18 ⚠	MA2062LF	ZENER, 6.2V	1
D19	MA151WK	DIODE	1
D20, 21	MA110	DIODE	2
D22	MA151WK	DIODE	1
D25, 26	MA110	DIODE	2
D27	EK04	DIODE	1
D28	MA8030L	ZENER, 3.1V	1
D29	MA110	DIODE	1
D30, 31	MA1062M	ZENER, 6.2V	2
D32, 33	MA110	DIODE	2
D34, 35	MA121	DIODE, SI, 100mA	2
D36	MA159A	DIODE, SI, 100mA	1
OSCILLATORS			
○ X1	QSXG2F2800A	CERAMIC OSCILLATOR	1
X2	EF0EC8004A5	8MHz, CERAMIC OSCILLATOR	1
X3	QSXG1A2500A	25MHz, QUARTZ OSCILLATOR	1
X4	QSXG1I3386A	CRYSTAL OSCILLATOR	1
X5	QSXG2F2400A	CERAMIC OSCILLATOR	1
COMPONENT COMBINATIONS			
Z1～4	EXBS8V103J	10KΩ×4	4
Z5	EXBV8V221J	220Ω×4	1
Z6	EXBV8V102J	1KΩ×4	1
Z7	EXBS8V102J	1KΩ×4	1
Z10～13	EXBS8V103J	10KΩ×4	4
Z14	EXBS8V221J	220Ω×4	1
Z15, 16	EXBV8V472J	4.7KΩ×4	2
Z17	EXBS8VR000	0Ω×4	1
Z18～24	EXBV8V470J	47Ω×4	7
Z25, 26	EXBS8V470J	47Ω×4	2
Z27～29	EXBV8V102J	1KΩ×4	3
Z30～36	EXBV8V470J	47Ω×4	7
Z37～47	EXBV8V471J	470Ω×4	11
Z48	EXBV8V102J	1KΩ×4	1
Z49	EXBV8V471J	470Ω×4	1
Z50, 51	EXBS8V103J	10KΩ×4	2
Z52～55	EXBV8V221J	220Ω×4	4
COILS			
L1～7	QLQGT3T150SA	15μH×3	7
L8	SLCG3A121T	120μH	1
L9	QLBG002A	0.45μH	1
L10	QLQGT1B800MA	80μH	1
JACKS			
JK1～3	QJJG005AA	JACK SOCKET	3
JK4, 5	QJJG003AA	JACK	2
JK6, 7	SJJG100A	JACK	2
JK8～11	QJJG003AA	JACK	4
RESISTORS			
R1	ERJ6GEYJ221V	220Ω	1
R2	ERJ6GEYJ330V	33Ω	1
R3	ERJ6GEYJ680V	68Ω	1
R4	ERJ6GEYJ102V	1KΩ	1
R5	ERJ6GEYJ151V	150Ω	1
R6	ERJ6GEYJ331V	330Ω	1
R7	ERJ6GEYJ224V	220KΩ	1
R8	ERJ6GEYJ104V	100KΩ	1
R9	ERJ6GEYJ103V	10KΩ	1
R10	ERJ6GEYJ102V	1KΩ	1
R11	ERJ6GEYJ680V	68Ω	1
R12	ERJ6GEYJ104V	100KΩ	1
R13, 14	ERJ6GEYJ103V	10KΩ	2
R15, 16	ERJ6GEYJ102V	1KΩ	2
R18	ERJ6GEYJ221V	220Ω	1
R19	ERJ6GEYJ102V	1KΩ	1
R20	ERJ6GEYJ104V	100KΩ	1
R21	ERJ6GEYJ221V	220Ω	1
R22	ERJ6GEYJ103V	10KΩ	1
R23～25	ERJ6GEYJ101V	100Ω	3
R26	ERJ6GEYJ102V	1KΩ	1
R28, 29	ERJ6GEYJ221V	220Ω	2
R30	ERJ6GEYJ102V	1KΩ	1
R31	ERJ6GEYJ221V	220Ω	1
R33	ERJ6GEYJ104V	100Ω	1
R34	ERJ6GEYJ102V	1KΩ	1
R35	ERJ6GEYJ222V	2.2KΩ	1
R36	ERJ6GEYJ102V	1KΩ	1
R37	ERJ6GEYJ474V	470KΩ	1
R38	ERJ6GEYJ221V	220Ω	1
R39～42	ERJ6GEYJ472V	4.7KΩ	4
R43, 44	ERJ6GEYJ103V	10KΩ	2
R45, 46	ERJ6GEYJ472V	4.7KΩ	2
R47～49	ERJ6GEYJ221V	220Ω	3
R50	ERJ6GEYJ333V	33KΩ	1
R51	ERJ6GEYJ473V	47KΩ	1
R52	ERJ6GEYJ221V	220Ω	1
R53	ERJ6GEYJ104V	100KΩ	1
R54	ERJ6GEYJ103V	10KΩ	1
R55	ERJ6GEYJ682V	6.8KΩ	1
R56	ERJ6GEYJ102V	1KΩ	1
R57～61	ERJ6GEYJ103V	10KΩ	5
R62	ERJ6GEYJ102V	1KΩ	1
R63	ERJ6GEYJ151V	150Ω	1
R64, 65	ERJ6GEY0R00V	0Ω	2
R67	ERJ6GEYJ221V	220Ω	1
R68	ERJ6GEYJ330V	33Ω	1
R69, 70	ERJ6GEYJ680V	68Ω	2
R71	ERJ6GEYJ151V	150Ω	1
R72	ERJ6GEYJ331V	330Ω	1
R73	ERJ6GEYJ224V	220KΩ	1
R74	ERJ6GEYJ102V	1KΩ	1
R75	ERJ6GEYJ104V	100KΩ	1
R76	ERJ6GEYJ103V	10KΩ	1
R77	ERJ6GEYJ221V	220Ω	1
R78	ERJ6GEYJ104V	100KΩ	1
R79	ERJ6GEYJ472V	4.7KΩ	1
R81	ERG1SJ331	330Ω, 1W, Flame Type	1
R82	ERJ6GEYJ331V	330Ω	1
R83	ERJ6GEYJ101V	100Ω	1
R84	ERJ6GEYJ221V	220Ω	1
R85	ERJ6GEYJ471V	470Ω	1
R86	ERJ6GEYJ683V	68KΩ	1
R87	ERJ6GEYJ221V	220Ω	1
R88	ERJ6GEYJ472V	4.7KΩ	1
R89	ERJ6GEYJ221V	220Ω	1
R90, 91	ERJ6GEYJ122V	THICK FILM CHIP RESISTOR, 1/10W	2
○ R92	ERJ6GEYF102V	THICK FILM CHIP RESISTOR, 1/10W	1
R93	ERJ6GEYJ101V	100Ω	1
R94	ERJ6GEYJ152V	1.5KΩ	1
R95～97	ERJ6GEYJ101V	100Ω	3
R98	ERJ6GEYJ472V	4.7KΩ	1
R99	ERJ6GEYJ221V	220Ω	1

Ref. No.	Part No.	Description	P/S
R100	ERJ6GEYJ102V	1KΩ	1
R101	ERJ6GEYJ104V	100KΩ	1
R102	ERJ6GEYJ101V	100Ω	1
R103	ERJ6GEYJ221V	220Ω	1
R104～107	ERJ6GEYJ102V	1KΩ	4
R108～110	ERJ6GEYJ221V	220Ω	3
R111	ERJ6GEYJ101V	100Ω	1
R112	ERJ6GEYJ471V	470Ω	1
R113	ERJ6GEYJ221V	220Ω	1
R114, 115	ERJ6GEYJ471V	470Ω	2
R116～118	ERJ6GEYJ103V	10KΩ	3
R119	ERJ6GEYJ682V	6.8KΩ	1
R120	ERJ6GEYJ104V	100KΩ	1
R121	ERJ6GEYJ124V	120KΩ	1
R122	ERJ6GEYJ330V	33Ω	1
R123	ERJ6GEYJ102V	1KΩ	1
R124	ERJ6GEYJ682V	6.8KΩ	1
R125	ERJ6GEYJ104V	100KΩ	1
R126	ERJ6GEYJ124V	120KΩ	1
R127	ERJ6GEYJ330V	33Ω	1
R128	ERJ6GEYJ102V	1KΩ	1
R129, 130 ⚠	ERG1SJ330	33Ω, 1W	2
R131, 132	ERJ6GEYJ681V	680Ω	2
R133, 134	ERJ6GEYJ103V	10KΩ	2
R135	ERJ6GEYJ682V	6.8KΩ	1
R136	ERJ6GEYJ105V	1MΩ	1
R137	ERJ6GEYJ104V	100KΩ	1
R138	ERJ6GEYJ124V	120KΩ	1
R139	ERJ6GEYJ681V	680Ω	1
R140	ERJ6GEYJ103V	10KΩ	1
R141	ERJ6GEYJ682V	6.8KΩ	1
R142, 143	ERJ6GEYJ104V	100KΩ	2
R144	ERJ6GEYJ124V	120KΩ	1
R145	ERJ6GEYJ681V	680Ω	1
R146	ERJ6GEYJ104V	100KΩ	1
R147, 148	ERJ6GEYJ152V	1.5KΩ	2
R149, 150	ERJ6GEYJ102V	1KΩ	2
R151～155	ERJ6GEY0R00V	0Ω	5
R156	ERJ6GEYJ102V	1KΩ	1
R157	ERJ6GEYJ471V	470Ω	1
R158～160	ERJ6GEYJ470V	47Ω	3
R161	ERJ6GEYJ103V	10KΩ	1
R162～164	ERJ6GEYJ102V	1KΩ	3
R165	ERJ6GEYJ470V	47Ω	1
R166, 167	ERJ6GEYJ102V	1KΩ	2
R168	ERJ6GEYJ103V	10KΩ	1
R169, 170	ERJ6GEYJ102V	1KΩ	2
R171, 172	ERJ6GEYJ471V	470Ω	2
R173, 174	ERJ6GEYJ104V	100KΩ	2
R175	ERJ6GEYJ102V	1KΩ	1
R176	ERJ6GEYJ471V	470Ω	1
R177, 178	ERJ6GEYJ103V	10KΩ	2
R179～183	ERJ6GEYJ102V	1KΩ	5
R184	ERJ6GEYJ471V	470Ω	1
R186, 187	ERJ6GEYJ221V	220Ω	2
R188	ERJ6GEYJ471V	470Ω	1
R189	ERJ6GEYJ102V	1KΩ	1
R190, 191	ERJ6GEYJ221V	220Ω	2
R192	ERJ6GEYJ471V	470Ω	1
R200～210	ERJ6GEY0R00V	0Ω	11
CAPACITORS			
C1～8	ECUV1H104ZFX	0.1μF	8
C9	ECUV1H332KB	0.0033μF	1
C10～29, 31～34, 36	ECUV1H104ZFX	0.1μF	25
C37	ECUV1H333KBX	0.033μF	1
C39	ECUV1H221JG	220pF	1
C43～49	ECUV1H104ZFX	0.1μF	7
C50	ECUV1E224ZFX	0.22μF	1
C51～54	ECUV1H104ZFX	0.1μF	4
C55, 56	ECRF1H104ZF	0.1μF	2
C57	ECQV1H104JM	0.1μF	1
C58	ECRF1H104ZF	0.1μF	1
C59～62	ECUV1H104ZFX	0.1μF	4
C63, 64	ECUV1H101JG	100pF	2
C65	ECUV1H333KBX	0.033μF	1
C66～69	ECUV1H104ZFX	0.1μF	4
C70	ECUV1H103KBG	0.01μF	1
C71	ECUV1H104ZFX	0.1μF	1
C72	ECUV1C104KBX	CERAMIC CAPACITOR, MULTI LAYER	1
C73, 74	ECUV1H100DCN	10pF	2
C75～77	ECUV1H104ZFX	0.1μF	3
C78, 79	ECUV1H100DCN	10pF	2
C80	ECUV1H104ZFX	0.1μF	1
C83	ECUV1H333KBX	0.033μF	1
C84	ECUV1H104ZFX	0.1μF	1
C85	ECUV1H472KBG	0.0047μF	1
C86	ECUV1H223KBX	0.022μF	1
C87	ECUV1H182JX	MULTILAYER CERAMIC CHIP CAPACITOR	1
C88	ECEA1HKA010	1μF, 50V	1
C89, 90	ECUV1H104ZFX	0.1μF	2
C91	ECQV1H104JM	0.1μF	1
C92, 93	ECUV1H221JG	220pF	2
C94～98	ECUV1H104ZFX	0.1μF	5
C99	ECEA1CKA101	100μF, 16V	1
C101	ECUV1H104ZFX	0.1μF	1
C102～104	ECRF1H104ZF	0.1μF	3
C105	ECUV1H104ZFX	0.1μF	1
C107	ECEA1CKA100	10μF, 16V	1
C109	ECUV1H103KBG	0.01μF	1
C110	ECEA0JU102	1000μF, 6.3V	1
C111～113	ECUV1H104ZFX	0.1μF	3
C114	ECEA0JKA470	47μF, 6.3V	1
C115	EECS5R5V105	1F, 5.5V, MEMORY BACK-UP	1
C116	ECEA1CKA100	10μF, 16V	1
C117	EECS5R5V105	1F, 5.5V, MEMORY BACK-UP	1
C118～126	ECUV1H104ZFX	0.1μF	9
C127, 128	ECUV1H060DCN	6pF	2
C129～143	ECUV1H104ZFX	0.1μF	15
C144	ECCR1H470J	47pF	1
C145	ECUV1H104ZFX	0.1μF	1
C146	ECEA0JU102	1000μF, 6.3V	1
C147～149	ECUV1H104ZFX	0.1μF	3
C150	ECEA0JKA470	47μF, 6.3V	1
C151	ECUV1H102JX	0.001μF	1
C152	ECUV1H100DCN	10pF	1
C153～156	ECUV1H104ZFX	0.1μF	4
C157, 158	ECRF1H104ZF	0.1μF	2
C159	ECUV1H102JX	0.001μF	1
C160	ECUV1H470JG	47pF	1
C161	ERJ6GEY0R00V	0Ω	1
C162～165	ECUV1H104ZFX	0.1μF	4
C166, 167	ECUV1H102JX	0.001μF	2
C168～171	ECUV1H104ZFX	0.1μF	4
C172	ECRF1H104ZF	0.1μF	1
C173	ECQV1H104JM	0.1μF	1
C174, 175	ECUV1H470JG	47pF	2
C176, 177	ECEA1CKN100	10μF, 16V	2
C178, 179	ECUV1H103KBG	0.01μF	2
C181, 182	ECUV1H222KX	0.0022μF	2
C183	ECUV1H104ZFX	0.1μF	1
C184, 185	ECUV1H222KX	0.0022μF	2
C186	ECUV1H104ZFX	0.1μF	1

Ref. No.	Part No.	Description	P/S
C187	ECUV1H220JCN	22pF	1
C188	ECUV1C224KBX	CERAMIC CAPACITOR, MULTI LAYER	1
C189	ECQV1H104JM	0.1μF	1
C190	ECUV1H101JG	100pF	1
C191, 192	ECEA1CKN100	10μF, 16V	2
C193	ECUV1H104ZFX	0.1μF	1
C194	ECUV1H221JG	220pF	1
C195, 196	ECUV1H104ZFX	0.1μF	2
C198, 199	ECUV1H221JG	220pF	2
C200	ECUV1H470JG	47pF	1
C201~212	ECUV1H104ZFX	0.1μF	12
C213, 214	ECUV1E224ZFX	0.22μF	2
C215	ECUV1H104ZFX	0.1μF	1
C216~219	ECEA1HKN010	1μF, 50V	4
C220	ECUV1H101JG	100pF	1
C221	ECEA1EKA100	10μF, 25V	1
C222~225, 227, 228	ECUV1H104ZFX	0.1μF	6
C229~231	ECUV1H100DCN	10pF	3

MB1 MODULATION BALL 1 CIRCUIT

Ref. No.	Part No.	Description	P/S
VARIABLE RESISTOR			
○ VR1	QRVG41B01B54	VARIABLE RESISTOR	1

MB2 MODULATION BALL 2 CIRCUIT

Ref. No.	Part No.	Description	P/S
VARIABLE RESISTOR			
○ VR2	QRVG22B01B54	VARIABLE RESISTOR	1

ACP AC POWER SUPPLY CIRCUIT

Ref. No.	Part No.	Description	P/S
DIODES			
D1~4 ⚠	SVDS3V20	RECTIFIER	4
D5~8 ⚠	SVDGERA1502	RECTIFIER	4
D9	MA4220M	ZENER, 22V	1

Ref. No.	Part No.	Description	P/S
LINE FILTER			
L1 ⚠	SLTGLF3	LINE FILTER	1
FUSES			
F1 ⚠	XBA1C16NU100	1.6A, 125V, M MC XM	1
F1 ⚠	XBA2C10TB0	T1.0A, 250V, X XR XS XD XT	1
F2 ⚠	XBA2C05TB0	T500mAL, 250V, EN EK EZ EW EF EA EH EP XL XP X XR XS XD XT	1
F3 ⚠	XBA2C20TB0	T2A, 250V, EN EK EZ EW EF EA EH EP XL XP X XR XS XD XT	1
F3 ⚠	XBA1C25NU100	2.5A, 125V, M MC XM	1
RESISTORS			
R1, 2	ERDS2TJ103	10kΩ	2
R3 ⚠	ERD2FCVJ4R7	4.7Ω, 1/4W, FUSE TYPE	1
R4	ERDS2TJ471	470Ω	1
R5 ⚠	ERX2ANJPR22S	0.22Ω, 2W, FLAME-PROOF	1
○ R6 ⚠	ERQ1CJP220S	FUSE RESISTOR, 1W	1
R7~9 ⚠	ERD2FCVJ4R7	4.7Ω, 1/4W, FUSE TYPE	3
CAPACITORS			
C1 ⚠	ECKCVA1472MF	4700pF, LINE CAPACITOR	1
C2, ⚠	ECQU2A104MT	0.1μF, 250V, ACROSS-THE LINE CAPACITOR	1
C3 ⚠	ECQE1A104M6	0.1μF, 125V	1
C4 ⚠	ECEA1EU222	2200μF, 25V	1
C5	ECA1EM682E	6800μF, 25V	1
C6	ECEA1VKA100	10μF, 35V	1
C7	ECEA1VKA330	33μF, 35V	1
C8	ECEA1EU101	100μF, 25V	1
○ C9, 10	ECA1EM331	ALUMINIUM CAPACITOR	2

INV INVERTER CIRCUIT

Ref. No.	Part No.	Description	P/S
TRANSISTORS			
Q1, 2	2SC3940ARS	TRANSISTOR	2
TRANSFORMER			
T1 ⚠	QTDG003A	TRANSFORMER	1
IC PROTECTOR			
IP1 ⚠	ICP-N10T104	IC PROTECTOR	1
RESISTORS			
R1, 2	ERDS2TJ562	5.6kΩ	2

Ref. No.		Part No.	Description	P/S
CAPACITORS				
	C1	ECEA0JKA101	100µF, 6.3V	1
	C2	ECRF1H104ZF	0.1µF	1
S	C3, 4 ⚠	ECCD3F180JGE	18pF	2
	C5	ECHS1473JZW	0.047µF	1

CPC CONTROL PANEL CENTER CIRCUIT

Ref. No.		Part No.	Description	P/S
INTEGRATED CIRCUITS				
	IC2, 3	HD74LS07P	HEX BUFFERS	2
TRANSISTORS				
	Q1~3, 5, 6	2SA830SB	TRANSISTOR	5
DIODES				
	D25~70, 73~88	MA165	DIODE	62
	D132~137, 164	SEL2210SM	LED (RED)	7
○	D140~145	SEL2410E	LED, SI	6
	D146	SEL6210S	LED (RED)	1
	D147	SEL6410E	LED (GREEN)	1
OSCILLATOR				
	X1	EF0EC4004A3	4MHz, CERAMIC OSCILLATOR	1
SWITCHES				
	ESW1	QSRGT002AA	ENCODER SWITCH	1
	S25~70, 73~88	EVQ21507K	PUSH SWITCH	62
IC PROTECTOR				
	IP1 ⚠	ICP-N10T104	IC PROTECTOR	1
VARIABLE RESISTOR				
	VR2	QRVG20N01B14	10kΩ B	1
RESISTORS				
	R1~11	ERDS2TJ680	68Ω	11
	R12~14, 16~25	ERDS2TJ103	10kΩ	13
	R26	ERDS2TJ333	33kΩ	1
	R27, 28	ERDS2TJ101	100Ω	2
	R29, 30	ERDS2TJ472	4.7kΩ	2
	R31, 32	ERDS2TJ473	47kΩ	2
	R33~37	ERDS2TJ102	1kΩ	5
CAPACITORS				
	C1~3	ECRF1H104ZF	0.1µF	3
	C4	ECEA0JKA221	220µF, 6.3V	1
	C5	ECQB1H223JF	0.022µF	1
	C6	ECEA0JKA470	47µF, 6.3V	1
	C7, 8	ECQG1H102KZ	0.001µF	2
	C9~12	ECRF1H104ZF	0.1µF	4

CPR CONTROL PANEL RIGHT CIRCUIT

Ref. No.		Part No.	Description	P/S
DIODES				
	D1~24	MA165	DIODE	24
	D100~115, 120~123	SEL2210SM	LED (RED)	20
○	D116~119	SEL2410E	LED, SI	4
	D152	LN282R	LED (RED)	1
SWITCHES				
	S1~24	EVQ21507K	PUSH SWITCH	24

CPL CONTROL PANEL LEFT CIRCUIT

Ref. No.		Part No.	Description	P/S
DIODES				
	D71	MA165	DIODE	1
	D138, 139, 160, 161	LN282R	LED (RED)	4
SWITCH				
	S71	EVQ21507K	PUSH SWITCH	1
VARIABLE RESISTOR				
○	VR1	QRVG30N02B24	VARIABLE RESISTOR, 0.2W	1

MOD1 MODULATION 1 CIRCUIT

Ref. No.		Part No.	Description	P/S
VARIABLE RESISTOR				
	VR1	QRVG16A02B54	50kΩ, B	1

MOD2 MODULATION 2 CIRCUIT

Ref. No.		Part No.	Description	P/S
VARIABLE RESISTOR				
○	VR1	QRVG16E01B54	VARIABLE RESISTOR, 0.05W	1
RESISTORS				
	R1, 2	ER0S2CKF1001	1kΩ, ±1%	2

BEND PITCH BEND CIRCUIT

Ref. No.	Part No.	Description	P/S
VARIABLE RESISTOR			
VR1	QRVG16A02B54	50kΩ, B	1
RESISTORS			
R1, 2	ER0S2CKF1001	1kΩ, ±1%	2

MKB1 MANUAL KEYBOARD 1 CIRCUIT

Ref. No.	Part No.	Description	P/S
DIODES			
D1~48	MA165	DIODE	48

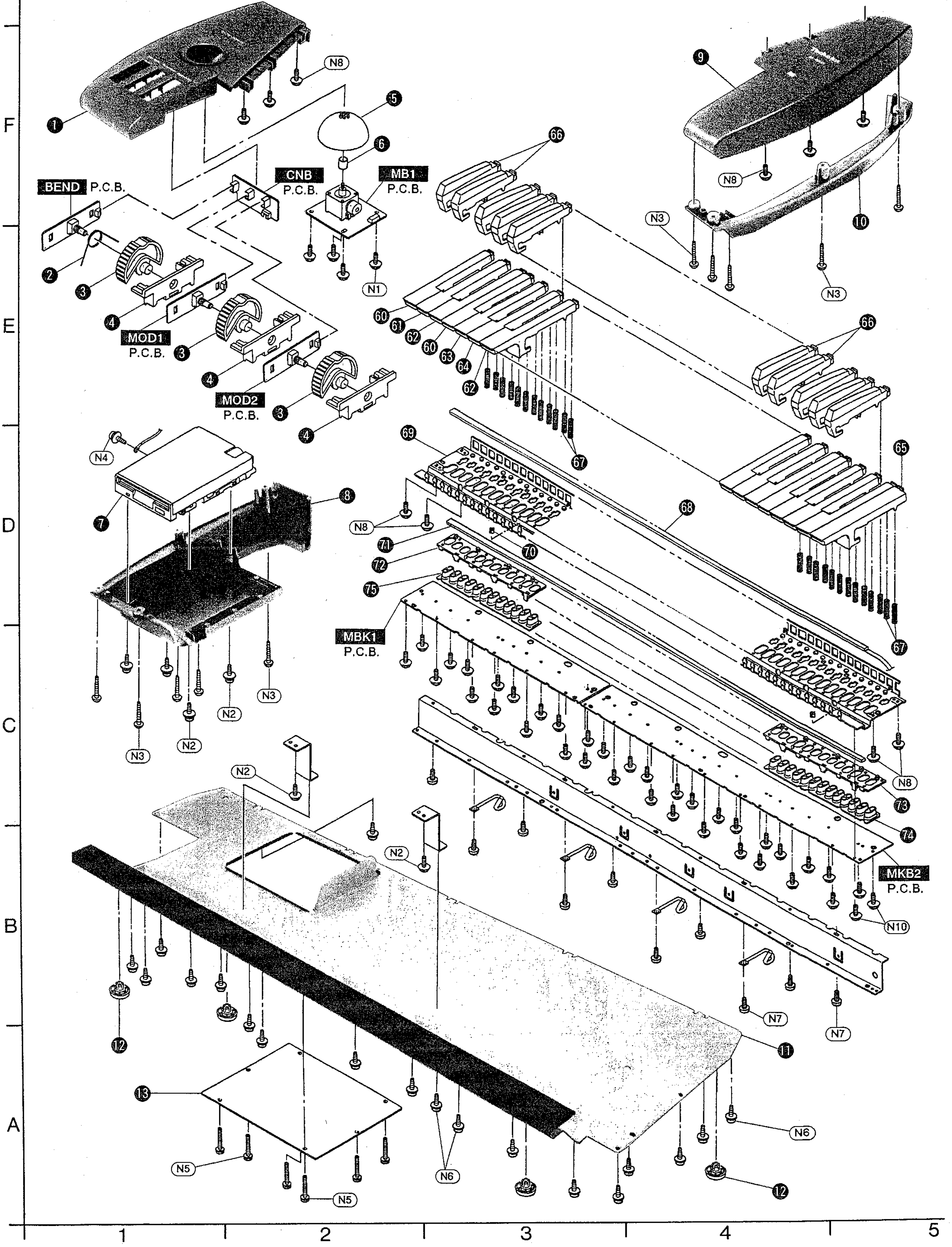
MKB2 MANUAL KEYBOARD 2 CIRCUIT

Ref. No.	Part No.	Description	P/S
INTEGRATED CIRCUITS			
IC1, 2	HD74LS138P	3 TO 8 DECODER	2
IC3	M5218AL	OPERATIONAL AMPLIFIER	1
IC4	ST93C46CB1	1M BIT PROGRAMMED EEPROM	1
DIODES			
D49~122	MA165	DIODE	74
VARIABLE RESISTOR			
VR1	EVSG0E1B223A	22kΩ B	1
RESISTORS			
R1	ERDS2TJ102	1kΩ	1
R2	ERDS2TJ472	4.7kΩ	1
R3	ERDS2TJ222	2.2kΩ	1
R4	ERDS2TJ472	4.7kΩ	1
CAPACITORS			
C1, 2	ECRF1H104ZF	0.1μF	2
C3	ECEA0JKA470	47μF, 6.3V	1
C4, 5	ECRF1H104ZF	0.1μF	2

WIRING PARTS

	Ref. No.	Part No.	Description	P/S
○	W1 ⚠	QEXGVH03020B	COMMU CABLE W/OUT PLUG	1
○	W2 ⚠	QEXGVH04010B	COMMU CABLE W/OUT PLUG	1
○	W3 ⚠	QEXGSS06035A	COMMU CABLE W/OUT PLUG	1
○	W4 ⚠	QEXGSS05075A	COMMU CABLE W/OUT PLUG	1
	W5 ⚠	QEXGSS08025A	CONNECTOR WITH WIRE	1
○	W6 ⚠	QEXGSS04025A	COMMU CABLE W/OUT PLUG	1
	W7 ⚠	QEXGSS16065A	CONNECTOR WITH WIRE	1
○	W8 ⚠	QEXGSS04065A	COMMU CABLE W/OUT PLUG	1
○	W9 ⚠	QEXGSS05065A	COMMU CABLE W/OUT PLUG	1
○	W10 ⚠	QEXGZA34065A	COMMU CABLE W/OUT PLUG	1
○	W11 ⚠	QEXGSS06030A	COMMU CABLE W/OUT PLUG	1
○	W12 ⚠	QEXGSS06010A	COMMU CABLE W/OUT PLUG	1
	W13 ⚠	QEXGSS05020A	CONNECTOR WITH WIRE	1
○	W14 ⚠	QEXGVH07020B	COMMU CABLE W/OUT PLUG, X XR XS XD XT	1

CABINET PARTS LOCATION (A)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BEND P.C.B.
CNB P.C.B.
MB1 P.C.B.
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N8
N3
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N1
N3
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MOD1 P.C.B.
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MOD2 P.C.B.
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N4
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N8
71
70
72
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MBK1 P.C.B.
N3
N2
N2
N3
N2
67
N8
73
74
N2
MKB2 P.C.B.
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N6
N5
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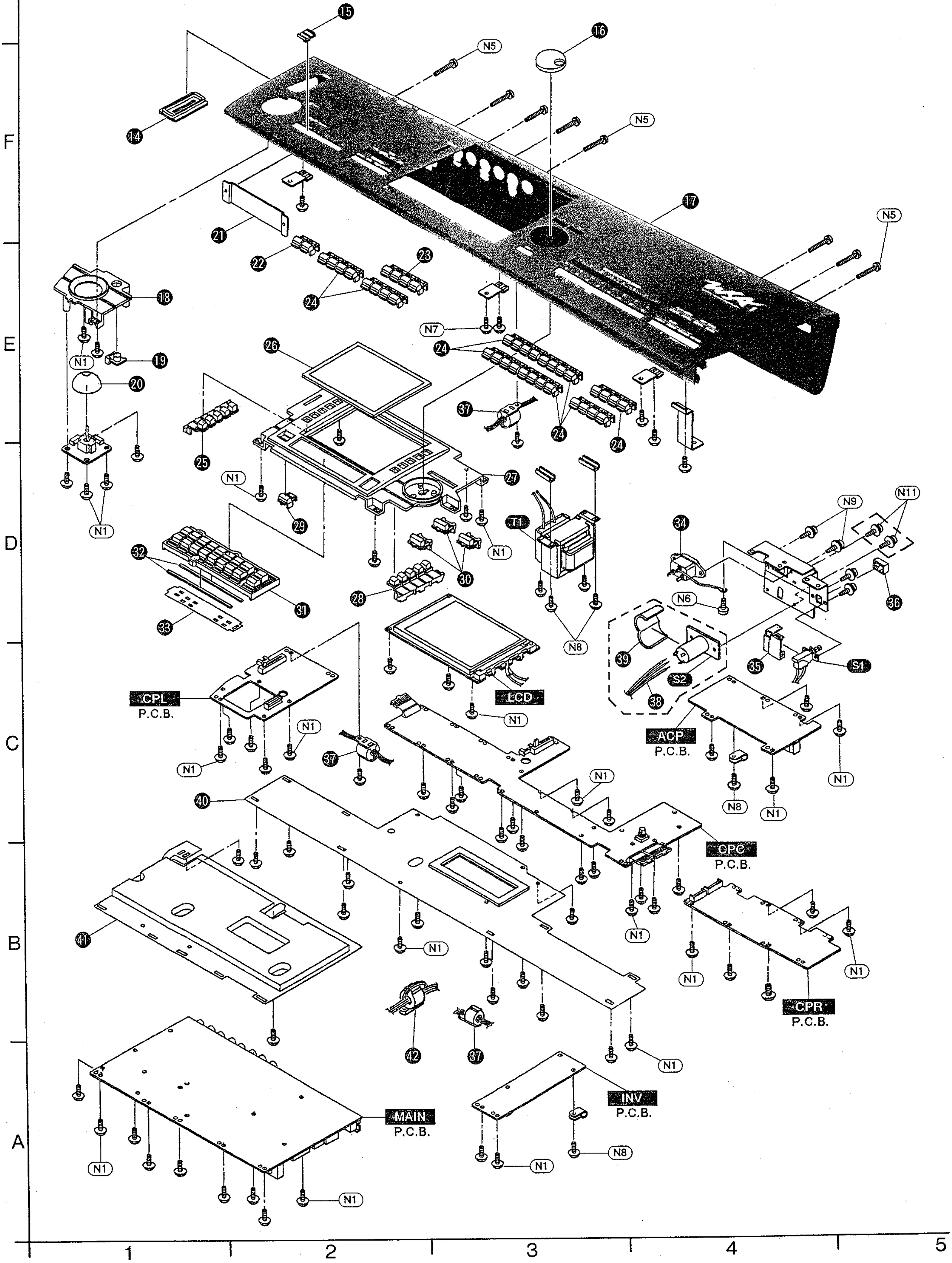
CABINET PARTS LOCATION (B)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N11
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T1
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D
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N1
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N6
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36
33
N8
39
35
S1
S2
CPL
P.C.B.
LCD
38
N1
N1
ACP
P.C.B.
N1
37
N1
N8
N1
40
CPC
P.C.B.
N1
41
N1
N1
N1
CPR
P.C.B.
42
37
N1
INV
P.C.B.
MAIN
P.C.B.
N8
N1
N1
N1
F
E
D
C
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A
1
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5

REPLACEMENT PARTS LIST……Cabinet and Chassis Parts

Notes:

1. The marking (RTL) indicates that the Retention Time is limited for this item. After the discontinuation of this assembly in production, the item will continue to be available for a specific period of time. The retension period of availability is dependant on the type of assembly, and in accordance with the laws governing part and product retention.
   After the end of this period, the assembly will no longer be available.
2. ○ mark are new parts.
3. Important safety notice
   Components identified by ⚠ mark have special characteristics important for safety. When replacing any of these components, use only manufacturer's specified parts.
4. For part No. with area mark, check the area when placing an order.
5. The raw material indication for synthetic resin
   In order to facilitate classification of parts of synthetic resin manufacture and to promote the recycling of natural resources, a raw material symbol for such parts is indicated in the Ref. No./Material column.

■ CABINET & CHASSIS PARTS

	Ref. No.		Part No.	Description	P/S
	SWITCHES				
	S1	⚠	ESB8273V	POWER SWITCH	1
	S2	⚠	ESE37209	VOLTAGE SELECTOR, X XR XS XD XT	1
	TRANSFORMER				
○	T1	⚠	QTPG1M036A	POWER TRANSFORMER, EN EK EZ EW EF EA EH EP XL XP	1
○	T1	⚠	QTPG1M035A	POWER TRANSFORMER, M MC XM	1
○	T1	⚠	QTPG1M037A	POWER TRANSFORMER, X XR XS XD XT	1
	POWER CORD & PLUG				
○	PC1	⚠	QJAG018AA	POWER CORD W/PLUG, 240V, EN EZ EF EA EH EP X XS XD XT XP	1
○	PC1	⚠	QJAG020AA	POWER CORD W/PLUG, 240V, EK	1
○	PC1	⚠	QJAG021AA	POWER CORD W/PLUG, 240V, EW	1
○	PC1	⚠	QJAG019AA	POWER CORD W/PLUG, 240V, XL XR	1
	PC1	⚠	SJAG44	POWER CORD W/PLUG, 120V, M MC XM	1
	PC2	⚠	SJP5213-1	ATTACHMENT PLUG, X XT XP	1
	CABINET PARTS				
○	1	PS	QGPG0103AB	LEFT UPPER PANEL	1
	2		SUSG570A	SPRING	1
○	3	ABS	QGUG3006AA	WHEEL	3
	4	PS	QMQG0016AA	BENDER CASE	3
○	5	ABS	QGUG3007AA	BALL	1
○	6		QWZG006AA	RECEIVING TUBE	1
	7	⚠	QAUG012AA	DDR DRIVE UNIT	1
○	8	PS	QKSGK014AB	LEFT LOWER PANEL	1
○	9	PS	QGPG0102AB	RIGHT UPPER PANEL	1
○	10	PS	QKSGK013AB	RIGHT LOWER PANEL	1
○	11		QKSGK015AA	BOTTOM PANEL	1
	12		SHRG2200A	LEG	4
○	13		QMAG0152BA	LID	1
○	14	PS	QMRG7067AA	ORNAMENT, PS	1
○	15	ABS	QGUG2002AA	KNOB	1
	16	ABS	QGUG3002BB	DIAL WHEEL	1
○	17		QGPG0105BA	CENTER PANEL, EN M MC EK EZ EW EF EA EH EP XL XM XP	1
○	17		QGPG0105AA	CENTER PANEL, X XR XS XD XT	1
○	18	PS	QGKG0123AA	ORNAMENT, PS	1
○	19	ABS	QGUG1416AA	PUSH BUTTON	1
○	20	ABS	QGUG3008AA	BALL	1
○	21		QGKG0126AA	LID	1
○	22	ABS	QGUG1415CA	PUSH BUTTON	1
○	23	ABS	QGUG1415BA	PUSH BUTTON	1
○	24	ABS	QGUG1415AA	PUSH BUTTON	8
○	25	ABS	QGUG1418AA	PUSH BUTTON	1
○	26		QKWG023AA	PLATE	1
○	27	PS	QGPG0104AB	ORNAMENT, PS	1
○	28	ABS	QGUG1419AA	PUSH BUTTON	1
○	29	ABS	QGUG1415DA	PUSH BUTTON	1
○	30	ABS	QGUG1417AA	PUSH BUTTON	3
○	31	ABS	QGUG1420AA	PUSH BUTTON	1
○	32		QMGG045AA	SPACER	2
○	33		QMFG4172AA	FELT	1
	34	⚠	SJSG460A	PLUG	1
	35		SHRG8390A	COVER, POWER SW	1
	36		SBCG110B	BUTTON, POWER SWITCH	1
	37	⚠	QLZG005A	CORE	3
○	38	⚠	QEXGVH07020B	COMMU CABLE W/OUT PLUG, X XR XS XD XT	1
	39		SUV453	SWITCH COVER, X XR XS XD XT	1
○	40		QSCG082A	MAGNETIC SHIELD	1
○	41		QSCG090A	MAGNETIC SHIELD	1
	42	⚠	QLZG006A	CORE	1
○	60		QMWG1033AA	WHITE KEY (C & F KEY)	10
○	61		QMWG1034AA	WHITE KEY (D KEY)	5
○	62		QMWG1035AA	WHITE KEY (E & B KEY)	10
○	63		QMWG1036AA	WHITE KEY (G KEY)	5
○	64		QMWG1037AA	WHITE KEY (A KEY)	5
○	65		QMWG1038AA	WHITE KEY (TOP OCTAVE C KEY)	1
○	66		QMWG2005AA	BLACK KEY	25
	67		QMBG007BA	SPRING	61
○	68		QMWG5003BA	AFTER SENSOR	1
○	69		QMWG3020AA	CHASSIS	1
	70		SHGG9052A	KEY GUIDE RUBBER	61
	71		QMFG1120CA	FELT	1
	72		QMWG8031DA	SPACER (12 PCS. ON ONE)	4
	73		QMWG8030CA	SPACER (13 PCS. ON ONE)	1
	74		QMWG6009BA	RUBBER SWITCH (13 PCS. ON ONE)	1

Ref. No.	Part No.	Description	P/S
75	QMWG6010BA	RUBBER SWITCH (12 PCS. ON ONE)	4
SCREWS & WASHERS			
N1	XTW3+8Q	SCREW	81
N2	XYN3+F8FZ	SCREW WITH WASHER	4
○ N3	XTB3+10GFZ	SCREW	10
N4	XYN3+F6	SCREW WITH WASHER	1
○ N5	XYA3+DJ14FZ	SCREW W/WASHER	16
○ N6	XYA4+DJ10FZ	SCREW W/WASHER	19
N7	XTB3+5C	SCREW	12
N8	XTW3+10QFZ	SCREW	22
N9	XYN3+F8FZ	SCREW WITH WASHER	4
N10	XTW3+10T	SCREW	37
N11	XYN3+F8FZ	SCREW, X XR XS XD XT	2

PACKING PARTS

Ref. No.	Part No.	Description	P/S
PACKING PARTS			
○ 1	QPGG0328AA	CUSHION, PAPER	1
○ 2 PS	QPNG0533AA	PAD, PS	1
○ 3 PS	QPNG0534AA	PAD, PS	1
○ 4	QPNG0569AA	PAD	1
○ 5	QPGG0327AA	PACKING CASE, PAPER	1
6 PE	QPFG002AA	POLYETHYLENE BAG	1
○ 8	QFVG2013A	DEMO DISK	1
OPERATIONG INSTRUCTION MANUAL			
○ 7	QQFGWSA1AA	OPERATING INSTRUCTION MANUAL, EN	1
○ 7-1	QQTG0359A	DANSK	1
○ 7-2	QQTG0360A	ENGLISH	1
○ 7-3	QQTG0361A	ENGLISH	1
○ 7	QQFGWSA1CA	OPERATING INSTRUCTION MANUAL, M	1
○ 7-1	QQTG0364A	ENGLISH	1
○ 7-2	QQTG0365A	ENGLISH	1
○ 7	QQFGWSA1DA	OPERATING INSTRUCTION MANUAL, MC	1
○ 7-1	QQTG0360A	ENGLISH	1
○ 7-2	QQTG0366A	FRANCAIS	1
○ 7-3	QQTG0361A	ENGLISH	1
○ 7-4	QQTG0367A	FRANCAIS	1
○ 7 ⚠	QQFGWSA1EA	OPERATING INSTRUCTION MANUAL, EK EP X XS XL XR XM XD XT XP	1
○ 7-1	QQTG0360A	ENGLISH	1
○ 7-2	QQTG0361A	ENGLISH	1
○ 7	QQFGWSA1FA	OPERATING INSTRUCTION MANUAL, EA	1
○ 7-1	QQTG0368A	DEUTSCH	1
○ 7-2	QQTG0369A	DEUTSCH	1
○ 7	QQFGWSA1GA	OPERATING INSTRUCTION MANUAL, EW	1
○ 7-1	QQTG0366A	FRANCAIS	1
○ 7-2	QQTG0368A	DEUTSCH	1
○ 7-3	QQTG0367A	FRANCAIS	1
○ 7-4	QQTG0369A	DEUTSCH	1
○ 7	QQFGWSA1HA	OPERATING INSTRUCTION MANUAL, EF	1
○ 7-1	QQTG0366A	FRANCAIS	1
○ 7-2	QQTG0370A	ITALIANO	1
○ 7-3	QQTG0367A	FRANCAIS	1
○ 7-4	QQTG0361A	ENGLISH	1
○ 7	QQFGWSA1JA	OPERATING INSTRCUTION MANUAL, EH	1
○ 7-1	QQTG0368A	DEUTSCH	1
○ 7-2	QQTG0371A	NERDERLANDS	1
○ 7-3	QQTG0369A	DEUTSCH	1
○ 7-4	QQTG0361A	ENGLISH	1
○ 7	QQFGWSA1KA	OPERATING INSTRUCTION MANUAL, EZ	1
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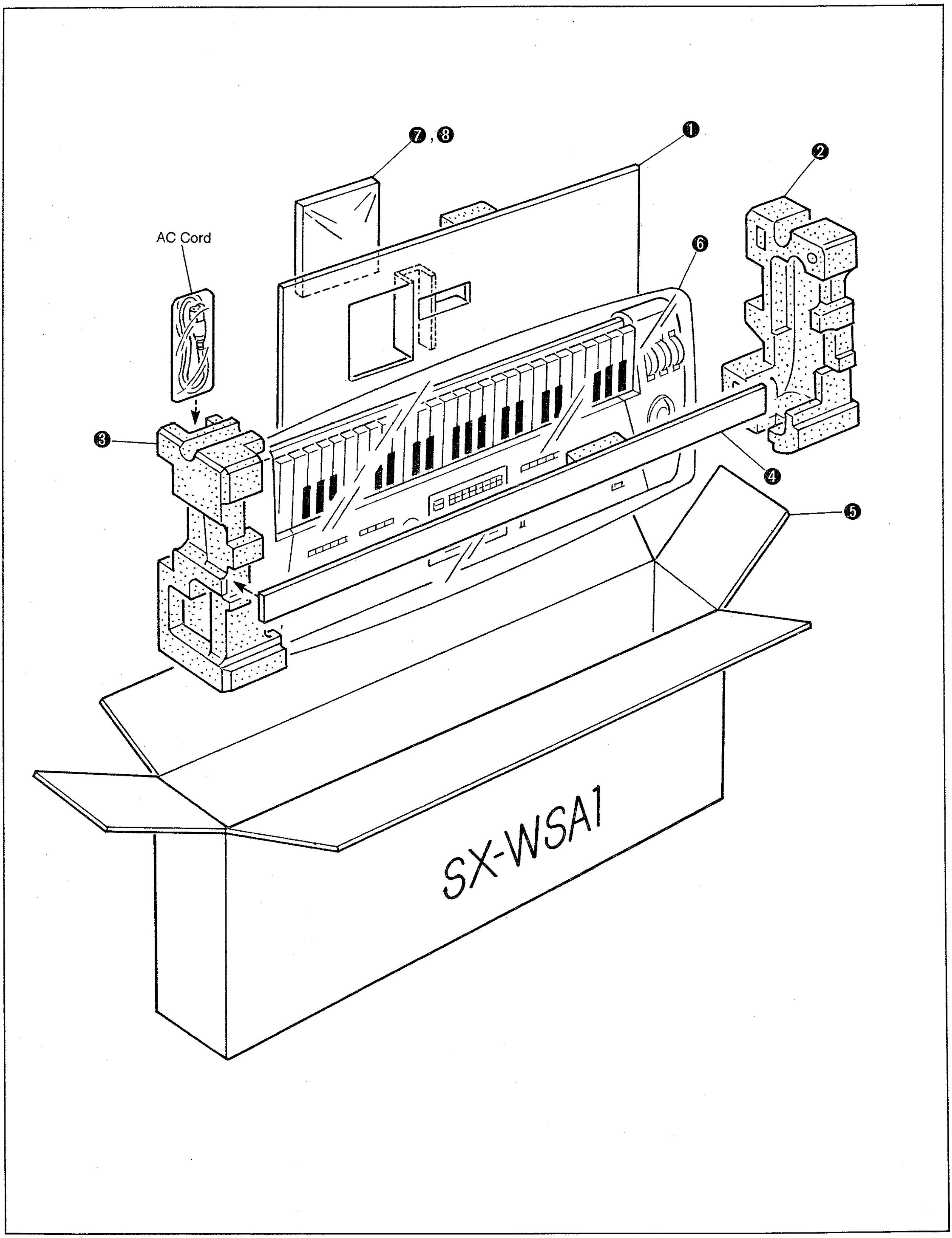
○ 7-2	QQTG0369A	DEUTSCH	1

PACKING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